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Importance of a bird migration hot spot: proportion of the Swedish population of various raptors observed on autumn migration at Falsterbo 1986–1995 and population changes reflected by the migration figures

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Abstract

The importance of Falsterbo, Sweden, as a concentration site for migrating raptors was assessed by recording total numbers of various species during ten autumns 1986–1995. Population estimates and number of fledged young per pair were taken from the literature to estimate the Swedish autumn population. These estimates were compared with the average numbers of migrants at Falsterbo to see how large proportion was recorded there and if there was any difference between adults and juveniles. The proportion observed at Falsterbo varied from below 1 % in Goshawk *Accipiter gentilis* to 38 % in Red Kite *Milvus milvus*. Species with more southerly distribution (breeding closer to Falsterbo), like Red Kite and Marsh Harrier *Circus aeruginosus* were recorded to a higher degree compared to northerly species like Northern Harrier *Circus cyaneus* and Rough-legged Buzzard *Buteo lagopus*. Thermal migrants like Honey Buzzard *Pernis apivorus*, Red Kite and Common Buzzard *Buteo buteo* were more concentrated at Falsterbo compared to active flyers like harriers and falcons, which are less inclined to follow leading lines. In most species a higher proportion of juveniles was recorded. This may be due to adults generally wintering further north or being less inclined to follow leading lines. Three species (Honey Buzzard, Rough-legged Buzzard and Peregrine *Falco peregrinus*) showed a higher percentage of adults. In these species I suggest the adults use their previous experience to follow established safe and efficient routes to their known winter quarters. Systematic autumn counts of migrating birds at Falsterbo have been conducted since 1973. The correlation of annual numbers with these standardised counts is significant in all species, although the average figures are between 38 and 214 percent higher in this study due to a better coverage. Most species are at the moment stable or increasing. Recent population increases in Red Kite, Marsh Harrier and Peregrine are very well reflected by the counts. Standardised migration counts at Falsterbo are presently the best way to follow long-time changes in the Swedish raptor populations.

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Introduction

At Falsterbo, the southwesternmost point of Scandinavia (Figure 1), the autumn migration has been studied since the early 1940s (Rudebeck 1950, Ufstrand *et al.* 1974). Since 1973 standardised counts of migrants have been carried out by the National Environmental Protection Board (Roos 1996 and earlier). With the development of better binoculars, especially telescopes, and the publication of good field guides it is nowadays also possible to determine the age of most migrants. Since 1986 I have conducted a study of the sex and age ratio among migrating raptors passing the Falsterbo peninsula (Kjellén 1992, unpublished). Ringing recoveries indicate that most of the counted raptors originate from Sweden, with additional birds from Norway and Finland in a few species (Roos 1984, Stolt *et al.* 1995 and earlier), but in some species the available information is rather limited. There are however a few raptors, like Rough-legged Buzzard, Northern Harrier and Peregrine, where a substantial proportion of the migrants at Falsterbo may be of Norwegian or Finnish origin. More or less accurate estimates of the Swedish population, as well as information on reproductive success of the different raptors, have been taken from the literature. If possible the number of fledged young/breeding attempt (including failed breedings and territorial pairs) has been used. Due to different migration strategies the proportion leaving via Falsterbo varies a great deal among various species and ages. In the present paper I discuss the origin of the birds counted at Falsterbo

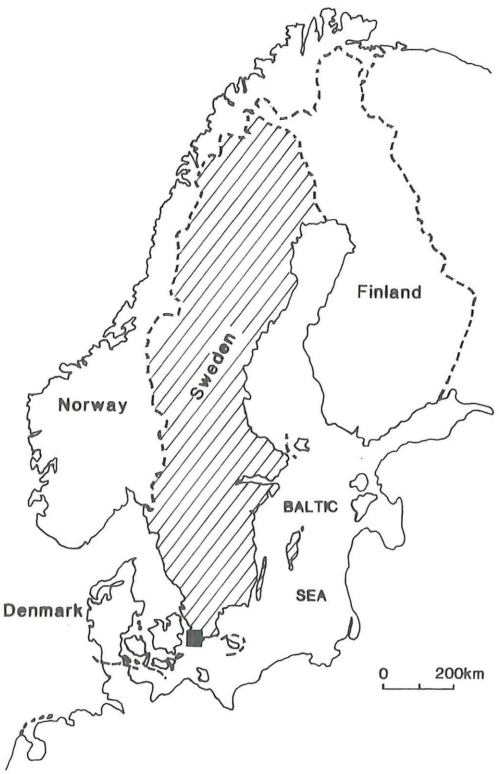

Figure 1. The position of the study area on the Falsterbo peninsula and the most likely recruitment area (Sweden).

Undersökningsområdet på Falsterbohalvön och det mest troliga rekryteringsområdet (Sverige).

in relation to different migration strategies and estimate the proportion of adults and juveniles of the Swedish autumn population migrating through Falsterbo. The value of the migration numbers as indicators of population changes is also evaluated. For monitoring purposes it is important to assess, in a quantitative way, the importance of concentration areas along migration routes for different species and age classes. In this respect Falsterbo provides unique qualifications with a fairly well defined recruitment area and rather accurate population estimates.

Methods

During the ten years 1986–1995 the raptor migration over the Falsterbo peninsula (55° 23' N 12° 50' E) was counted during the period from 1 August until 20 November. Observations started at dawn and continued as long as any migration was observed (normally some time in the afternoon). On days with bad weather, such as storm and rain, when migration is practically nonexistent, the counts were often cancelled. All birds were aged as far as possible using characters described by Forsman (1984) and Gensbøl (1995). Migrating raptors pass over the peninsula in a westerly to southwesterly direction towards Denmark (Figure 1). Dependent on the prevailing wind conditions, different observation points on the peninsula were chosen to be as close to the main migration stream as possible. Most observations were performed by the author but several other observers relieved on single days. On days with many birds at least two observers were normally working together. We used binoculars 10x40 and wide-angle telescopes 30x70. The ambition was to count as many as possible of the raptors passing the peninsula. Although the majority often pass in a "corridor" right above the observation point, it is impossible to cover all individuals in species migrating on a broader front, such as harriers and falcons, (cf. Kjellén 1992 for a more detailed discussion on the coverage).

Table 1. Proportion of the Swedish population of various rapto
Andel av den svenska populationen av olika rovfåglar som inrä

Species *Art*	Estimated Swedish population (pairs) *Beräknad svensk population (par)*	Average production of young *Genomsnittlig ungproduktion*
Honey Buzzard	6 000	0.6
Red Kite	500	1.7
White-tailed Eagle	170	0.7
Marsh Harrier	1 400	2.0
Northern Harrier	1 500	1.8
Montagu's Harrier	60	2.0
Goshawk	7 000	2.0
Eurasian Sparrowhawk	20 000	2.0
Common Buzzard	19 500	1.4
Rough-legged Buzzard	7 000	0.7
Osprey	3 200	1.5
Eurasian Kestrel	3 000	2.5
Merlin	5 000	2.3
Hobby	1 000	1.5
Peregrine	60	1.7

n at Falsterbo 1986–1995.
es i Falsterbo åren 1986–1995.

Estimated autumn population *Beräknad höst-population*	Average total at Falsterbo 1986–95 *1991–95 *Medeltal i Falsterbo 1986–95 *1991–95*	Standard deviation *Standard-avvikelse*	% seen *% sedda*	Average adult total *Medeltal adulta*	% seen *% sedda*	Average juvenile total *Medeltal juvenila*	% seen *% sedda*
15 600	5 205	1 751	33	4 599	38	606	17
1 850	*694	121	38	167	17	527	62
460	*14	3	3	9	3	5	4
5 600	*791	91	14	169	6	622	22
5 700	216	84	4	91	3	124	5
240	10	5	4	5	4	5	4
28 000	49	34	0	3	0	46	0
80 000	14 218	3 227	18	2 900	7	11 152	28
66 300	10 850	2 182	16	6 250	16	4 600	17
18 900	930	281	5	715	5	216	4
11 200	238	71	2	121	2	125	3
13 500	427	127	3	126	2	307	4
21 500	197	42	1	23	0	165	1
3 500	44	12	1	6	0	38	3
220	25	7	11	17	14	8	8

The proportion of undetermined birds (with respect to age and sex) varied from only 1 % in Goshawk and 3 % in Honey Buzzard to 94 % in Eurasian Sparrowhawk. In some species, for example Northern Harrier, a large proportion was labelled "♀/juv" meaning that they were either adult females or juveniles. In most species the proportion of unidentified birds decreased over the ten years as the observers' experience increased. The overall seasonal timing and total proportions of different age classes were estimated for each species on the basis of the samples of identified individuals (with respect to age), weighted by the total number of individuals during ten-day periods. For example, if 20 % of the identified Common Buzzards in the last ten-day period of September during one year were juveniles, 20 % of the unidentified Common Buzzards in this period were also assumed to be juveniles and the rest adults.

The most recent and precise population estimates from the literature have been used. Compiled estimates of the Swedish populations of different raptors can be found in the Check-list of Birds of Sweden, published by the Swedish Ornithological Society (1990) as well as in Ahlén & Tjernberg (1996). Especially in the uncommon species more accurate estimates of the number of breeding pairs have been published in connection with recent censuses, while the figures in more common raptors are based on extrapolations from densities in smaller areas. As a measure of reproductive success the average number of fledged young per territorial pair has been used. If available, figures from Scandinavia were utilised, but otherwise breeding data were taken from other parts of Western Europe.

Results and comments

The results are compiled in Table 1. References of the estimated population figures and average production of young are given in the sections under each species below. Based on these figures an average autumn population was calculated. The average total number of migrants and standard deviation as well as the mean numbers of adults and juveniles at Falsterbo during the ten years are given. In a few species where the population has increased dramatically during the period the average during the last

five years, more reflecting the present status, was used. The percentage of the estimated autumn population of the three categories seen at Falsterbo is given (Table 1). Adults include a varying number of non-breeding immatures. No attempt was made to separate this proportion since the fairly small numbers hardly affect the general picture except in species as large as White-tailed Eagle. In some species, breeders from Finland and Norway occur among the migrants at Falsterbo. It is however generally not possible to calculate/separate this proportion. The used figures on population size and breeding success are likely to be more accurate in well studied species like Red Kite and Peregrine, compared to species like Northern Harrier and Rough-legged Buzzard where detailed population studies in Scandinavia from later years are lacking. Also, a greater number of juveniles than adults are likely to die between the breeding and the start of the autumn migration at Falsterbo. These reservations are however not likely to affect the general differences between species and age-classes. Some comments are given in the presentation of the results under the different species below.

Honey Buzzard *Pernis apivorus*

The Swedish population was estimated at 8000 pairs in the late 1970s (Nilsson 1981). However, the standardised counts at Falsterbo show a significant decrease in the numbers at Falsterbo during the last 20 years (Roos 1996), and the population was assumed to have decreased to 5000–6000 pairs in 1995 (Ahlén & Tjernberg 1996). Compared to other raptors the production of young is very low. A study in Uppland, Sweden revealed only 0.6 young/territorial pair (Tjernberg & Ryttman 1994), while 0.7 young/pair was recorded in Denmark (Jørgensen 1989). Since a rather large proportion of the pairs do not breed in years when food conditions are poor, higher figures from the Continent (Cramp & Simmons 1980) may partly be the result of exclusion of these non-breeders, that are more difficult to record.

A third of the estimated autumn population was counted at Falsterbo, which is a comparatively high proportion (Table 1). Although most Swedish Honey Buzzards seem to migrate via southern Sweden and Gibraltar, ringing recoveries show that the northernmost breeders may fly south through Finland and the Bosphorus as the Finnish breeders do (Stolt *et al.* 1992). On the other hand, it is likely that the migrants at Falsterbo include some Norwegian breeders (approx. 500 pairs – Koskimies 1993). Contrary to most other species the proportion of juveniles counted at Falsterbo was considerably lower than that of adults. Obviously the juveniles are less concentrated to the peninsula, indicating migration on a generally broader front. This is supported by a larger individual variation in ringing recovery directions among young birds during their first autumn migration through Europe as compared to adults (Stolt *et al.* 1992). Also the proportion of juveniles among migrants increases eastwards from Hellebaek on the island Zealand in Denmark, via Falsterbo, to Ottenby on the Swedish island Öland in the Baltic (Søgaard & Østerby 1989).

Red Kite *Milvus milvus*

The Red Kite primarily breeds in Skåne, the southernmost province of Sweden. It has made a remarkable recovery from approximately 50 pairs in 1970 to 650 pairs in 1995 (Kjellén 1996a). For the period 1991–1995 I have used 500 pairs as a representative population estimate. The breeding result has been steadily good with an average of 1.7 fledged young/breeding pair during the past nineteen years (Kjellén 1996a). As a consequence, the number of migrants at Falsterbo has increased from an average of 360 in the first half of the period to 694 in the second half. Most of the adults winter in Skåne, while only about 11 % of the wintering kites are juveniles (Kjellén 1994). This explains the clear dominance of young birds at Falsterbo (Table 1). Already Rudebeck (1950) estimated that 30 percent of the Swedish autumn population passed Falsterbo on migration. Sylvén (1987) calculated that almost all kites leaving Sweden migrate via Falsterbo, and if we subtract wintering birds close to 90 % of the remaining (migrating) juveniles were counted there during the last years. This extremely high concentration is explained by the proximity of the breeding range and a dependence on good thermal conditions during migration.

White-tailed Eagle *Haliaeetus albicilla*

The Swedish population is slowly increasing at the moment and was estimated at 150–195 pairs in 1995 (Ahlén & Tjernberg 1996). Also the production of young has improved with 0.6–0.8 young/pair in recent years (Ahlén & Tjernberg 1996). Most of the adults are more or less resident and rather few are seen at Falsterbo. Also the majority of younger birds spend the winter in southern Sweden. This is reflected in the low percentage of White-tailed Eagles counted at Falsterbo, but it is also possible that a few

birds from Norway and Finland are included. The "adults" in Table 1 include mainly subadults (88 % of the total), not yet sexually mature. Thus juveniles and subadults are clearly more inclined to leave Sweden during the winter than adult birds. With the late sexual maturity and start of breeding in White-tailed Eagle, the proportion of immatures is larger than in other species in this study.

Marsh Harrier *Circus aeruginosus*

Censuses of the Swedish population revealed 500 pairs in 1979 (Bylin 1981) and a marked increase to 1400 pairs in 1995 (Kjellén 1996b). This is reflected in a higher mean number of migrants at Falsterbo 1991–1995 (791) compared to the first five years of the period (488). The number of fledged young/breeding attempt varied between 2.0 and 2.3 in three studies from Sweden (Bengtson 1967, Andersson & Larsson 1971, Kjellén 1996b).

Since the Marsh Harrier does not breed regularly in Norway and the population in southern Finland primarily migrates to the east of the Baltic Sea, the migrants at Falsterbo can be assumed to originate from Sweden. A total of 14 % of the estimated autumn population is a comparatively high figure (Table 1). There is however a marked difference between the ages in the proportion seen, with a significantly higher relative number of juveniles. In reality the difference may be even larger since a substantial part of the "adults" at Falsterbo are second-year birds and thus not included in the breeding population. Most likely adults are less inclined to follow leading lines and less reluctant to cross larger bodies of open water, thus generally migrating on a broader front compared to the juveniles.

Northern Harrier *Circus cyaneus*

The Northern Harrier is primarily a bird of the taiga zone of northern Fennoscandia. The Swedish population was estimated to hold between 1000 and 2000 pairs in the late 1970s (Nilsson 1981). These figures are fairly uncertain and a recent decrease has been recorded in the coastal region of Norrbotten (Ove Stefansson, *pers. comm.*). Also, breeding densities may vary from year to year due to changes in vole numbers (Watson 1977, Alerstam 1990a). This also causes large annual variation in the breeding result. Figures from various countries in Western Europe indicate 1.3–2.1 fledged young/breeding pair (Newton 1979, Cramp & Simmons 1980). There was no pronounced rodent peak in northern Scandinavia during the period and the chosen average figure of 1.8 young may be an overestimate.

Apart from Swedish breeders, Northern Harriers from Norway and Finland (50–100 and 2000–4000 pairs, respectively – Koskimies 1993) can be assumed to pass Falsterbo. Martin Tjernberg (*pers. comm.*) estimates that at least 1000 migrants from Finland reach the coast of Uppland in the autumn. In any case the proportion at Falsterbo is markedly lower than in Marsh Harrier (Table 1). Also the difference in concentration between adults and juveniles is much less pronounced. However, if the production of young was in fact lower than the calculated figure, the dominance of juveniles would be slightly larger. The proportion of adults is higher among the few birds wintering in southern Sweden compared to the migrants at Falsterbo (Kjellén 1994).

Montagu's Harrier *Circus pygargus*

A total of 60 pairs was estimated to breed in Sweden 1993 (Tyrberg 1994) and the production varied between 1.5 and 2.5 young in the 1970s (Ahlén & Tjernberg 1996). Montagu's Harrier is comparatively rare at Falsterbo with an annual average of only 10 migrants in the period (Table 1). Since it does not breed in Norway and is rare in Finland the counted birds are most likely Swedish. Like in the previous species migration takes place on a broad front and the concentration at Falsterbo is comparatively low. In contrast to the other harriers there was no difference in the proportion of adults and juveniles seen, but a comparatively high proportion (34 %) of the "adults" were second-year birds.

Goshawk *Accipiter gentilis*

After a slight increase in recent years the Swedish population was estimated to be in the order of 6000–8000 pairs in the middle of the 1990s (Ahlén & Tjernberg 1996). The production of young/pair varied from 1.6 to 3.1 in studies from northern Europe (Newton 1979, Cramp & Simmons 1980). Using 7000 pairs and 2 young/pair give as a result an estimated autumn population of 28 000 Goshawks. The majority of these are residents or migrate only within Sweden and the proportion reaching Falsterbo is only 0.2 percent. Among these migrants there is an overwhelming dominance of juveniles (Table 1). Large numbers of Finnish Goshawks winter in Sweden and a few of these may actually reach Falsterbo.

Eurasian Sparrowhawk *Accipiter nisus*

In the late 1970s the Swedish population was estimated at 14 000 pairs (Nilsson 1981). The breeding densities used in these calculations were considerably lower than those presented by Frankenberg (1982). Also, a significant increase in the numbers of migrants at Falsterbo during the last twenty years has taken place (Roos 1996). Thus it seems obvious that the present population is larger and I have used 20 000 pairs as a more realistic measure. Studies from the Netherlands and Germany report 1.7 and 2.0 young per clutch started, respectively (Tinbergen 1946, Kramer 1973). Although the Eurasian Sparrowhawk is the most numerous migrant at Falsterbo nowadays (Table 1), considerable numbers spend the winter in southern Sweden. However, it is not known how large the wintering population is. Ringing recoveries show that also birds from Norway and Finland migrate past Falsterbo (Roos 1984). With estimated populations of 5000 and 12 000–15 000 pairs, respectively (Koskimies 1993) the proportion of foreign Sparrowhawks at Falsterbo may be quite large. Martin Tjernberg estimate that in the order of 10 000 migrants from Finland reach Uppland in autumn. It may thus be a bit misleading to talk about the proportion of the estimated Swedish autumn population seen at Falsterbo and the calculated 18 percent may be regarded as an overestimate. It is however obvious that significantly more juveniles than adults pass Falsterbo and the proportion of young birds seen is among the highest in Table 1. The most likely explanation is that a larger percentage of the adults spend the winter in Sweden, but it is also possible that juveniles are more prone to concentrate at Falsterbo on migration.

Common Buzzard *Buteo buteo*

With an average of slightly below 11 000 the Common Buzzard was the secondmost common raptor at Falsterbo in the period. After a decline since the 1950s the Swedish population was estimated to comprise between 18 000 and 21 000 pairs in the late 1970s (Svensson 1979, Nilsson 1981). I have used the average number although a continued slight decrease is indicated by the number of migrants at Falsterbo (Roos 1996). However, equally large numbers of Common Buzzards annually leave Sweden from Northwest Skåne (approx. 800 km north of Falsterbo), and it can not be excluded that the proportion using this route has increased in recent years. A study in southernmost Sweden found 1.4 fledglings/territorial pair 1975–1980 (Sylvén 1982), but the production of young is probably lower in northern Scandinavia. Data from Continental Europe indicate breeding results of 0.6–1.7 young/pair (Newton 1979, Cramp & Simmons 1980).

Although wintering is regular in the extreme south, the great majority breeding in Sweden are migrants. Also Norwegian buzzards (1000–2000 pairs – Koskimies 1993) may pass Falsterbo, while Finnish breeders migrate south east of the Baltic Sea (Saurola 1977, Alerstam 1990a). The Common Buzzard is primarily dependent on thermal migration and the concentration to Falsterbo is comparatively high (Table 1). According to the calculations in Table 1 adults and juveniles appear in similar proportions on the peninsula. If we however use a lower reproduction figure and add a number of immature birds to the adults, the result would be a slight dominance of juveniles. On the other hand there was a dominance of adults among Common Buzzards wintering in Skåne, southernmost Sweden (Kjellén 1994), but the proportion spending the winter in Sweden is rather small.

Rough-legged Buzzard *Buteo lagopus*

In Scandinavia the Rough-legged Buzzard is primarily a bird of the northern mountains. A Swedish population of 7000 pairs was estimated in the late 1970s (Nilsson 1981), but it is probably lower today due to a lack of peak rodent years in the mountains of northern Sweden since 1982 (M. Tjernberg *pers. comm.*). Also, many pairs may not breed in years of low rodent numbers. The breeding result varies considerably due to fluctuations in prey densities (Alerstam 1990a). In peak years up to 2 young/pair may be raised (Hagen 1952, Pasanen 1972). There are no available figures from later years but there has been no peak in rodent numbers during the period (Hörnfeldt 1994). A poor food supply and low proportions of juveniles at Falsterbo during the period indicate generally poor breeding result, and I have chosen 0.7 as a probable measure of the average production/territorial pair, but even this may be too high.

The Rough-legged Buzzard is more inclined to migrate towards the southeast compared to other Swedish raptors. Ringing recoveries indicate that Finnish breeders as well as many birds from northern Scandinavia primarily migrate south on the eastern side of the Baltic (Dobler *et al.* 1991). Judged from these recoveries migrants at Falsterbo most likely constitute a mixture of Swedish breeders and

buzzards from Southern Norway (total Norwegian population 5000–10 000 pairs – Koskimies 1993). Since Norwegian breeders are included, the proportion of Swedish birds seen at Falsterbo is comparatively low (Table 1). The slight dominance of adults is supported by a significantly higher proportion of juveniles (31 %) further east, at Ottenby on the island Öland in the Baltic Sea, compared to 22 % at Falsterbo (Kjellén 1994). Contrary to most other raptors there was a higher proportion of juveniles among the relatively few birds wintering in southern Sweden, as compared to the autumn migrants at Falsterbo (Kjellén 1994).

Osprey *Pandion haliaetus*

The Swedish population is the largest in Europe with an estimated 3200 pairs in the beginning of the 1980s (SOF 1990). Odsjö & Sondell (1976) found 1.5 young per breeding pair in Sweden 1971–1973 compared to 1.8 young in 1960–1964. Although breeders from northernmost Sweden may migrate south through Finland it is possible that some birds from Norway (150–200 pairs – Koskimies 1993) occur at Falsterbo. The Osprey is a strong flyer migrating on a broad front and the concentration to Falsterbo is relatively low. A slightly higher proportion of the juveniles compared to adults was found on the peninsula (Table 1).

Eurasian Kestrel *Falco tinnunculus*

The Swedish population comprised at least 3000 pairs in the late 1980s with the majority in the northern part of the country (Ahlén & Tjernberg 1996). Especially northern breeders are affected by variations in rodent numbers (Korpimäki 1985). Both breeding densities and the average production of young is affected. In Norway the production per pair varied between 1.9 fledged young in poor years and 3.7 young in good years (Hagen 1952) and I have used 2.5 as an estimate of the mean result.

Small numbers spend the winter in southern Sweden, but the great majority of kestrels migrate further south. With only 3 percent of the estimated autumn population the concentration to Falsterbo is low (Table 1). Since some Norwegian breeders (1000–3000 pairs – Koskimies 1993) are most likely included the figure may in reality be even lower. The proportion of juveniles seen was twice as high as that of adults. This is most likely due to a greater tendency to follow leading lines in juveniles, although adults dominate among the few wintering kestrels (Kjellén 1994).

Merlin *Falco columbarius*

A total of 5000 pairs was estimated to breed in the northern mountains in the late 1970s (Nilsson 1981), and there are no indications of any population change since then. Although it mainly hunts birds, also the Merlin is affected by variation in rodent numbers. In a study from Norway the production was between 2.0 and 3.9 young/breeding pair (Hagen 1952). A detailed study in Padjelanta in Swedish Lappland recorded an average of 2.3 fledged young among 861 started breedings during the years 1978–1994 (Christer G. Wiklund, *pers. comm.*).

Like other falcons the Merlin uses active flight on migration and is less concentrated at migration hot spots compared to soaring migrants. Since also Norwegian birds (2000–6000 pairs – Koskimies 1993) may occur at Falsterbo the calculated 1 percent of the autumn population may be even lower. Very few adults are seen at Falsterbo and it is clear that the concentration is more pronounced in juveniles (Table 1).

Hobby *Falco subbuteo*

The Hobby is sparsely distributed primarily in the eastern half of Sweden and the population has been estimated to comprise 1000 pairs (Nilsson 1981). The reproduction rate is lower than in the other two small falcons and studies from continental Europe report 1.1–2.3 young/pair. The concentration to Falsterbo is low and the dominance of juveniles even more pronounced than in the previous species.

Peregrine *Falco peregrinus*

After a recent increase in numbers the Swedish population comprised approximately 60 pairs in 1994 and the production has risen to 2.6 young/successful breeding 1990–1994, equal to approximately 1.7 young per breeding attempt (Ahlén & Tjernberg 1996). It is most likely that several of the migrants at Falsterbo originate from the larger Norwegian and Finnish populations (100 and 100–120 pairs, respectively – Koskimies 1993). Most Peregrines leave Fennoscandia in winter, with northern breeders generally migrating longer distances (Ahlén & Tjernberg 1996). Thus the calculated 11 percent of the Swedish autumn population seen at Falsterbo is most likely an overestimation. The clearly

higher concentration of adults, compared to juveniles, to the peninsula is surprising. This because Peregrines are strong flyers not dependent on thermals and one would expect the more experienced adults to be less likely to migrate past concentration points like Falsterbo.

Discussion

Concentration rates of different raptors at Falsterbo

The proportion of the estimated Swedish population recorded at Falsterbo vary considerably between different raptors (Table 1). Roughly the species can be divided into two groups with high (11–38 %) contrary to low (0–5%) concentration rates (Table 2).

An almost total lack of species like Golden Eagle *Aquila chrysaetos* and Gyr Falcon *Falco rusticolus* is explained by their resident nature, with only a few younger birds reaching as far south as Falsterbo. In White-tailed Eagle and Goshawk the very low proportion seen is due to the majority spending the winter in Scandinavia. Also in Eurasian Sparrowhawk a considerable proportion spends the winter in southern Sweden.

Species with a more southerly distribution (with the majority breeding closer to Falsterbo), like Red Kite and Marsh Harrier, are recorded to a high degree compared to most other species. The one exception is Montagu's Harrier with a low proportion at Falsterbo in spite of a breeding range only extending over the southern third of Sweden. The population is however still primarily concentrated to Öland in the Baltic, and most likely the migration direction is generally more southeasterly. Although breeders from Norway and Finland support the numbers in raptors with a more northerly breeding range, these species generally occur to a lower degree at Falsterbo. This is obvious if we compare the northerly Northern Harrier and Rough-legged Buzzard with Marsh Harrier and Common Buzzard, having a more southern distribution.

The most obvious explanation for the variation in concentration is however found in the migration strategy. Raptors more dependent on thermal migration generally avoid longer sea crossings and are consequently more concentrated at narrow straits like the Bosphorus, Gibraltar and Falsterbo (Alerstam 1990a). Thermal migrants include Honey Buzzard, Red Kite, Common Buzzard and Rough-legged Buzzard. The considerably higher proportion of

Table 2. Concentration of the Swedish autumn population of various raptors at Falsterbo.

Koncentrationsgrad till Falsterbo hos olika svenska rovfåglar.

High concentration (11–38 % seen) *Hög koncentration (11–38 % sedda)*	Low concentration (0–5 % seen) *Låg koncentration (0–5 % sedda)*
Red Kite	Rough-legged Buzzard
Honey Buzzard	Northern Harrier
Common Buzzard	Montagu's Harrier
Marsh Harrier	White-tailed Eagle
Eurasian Sparrowhawk	Eurasian Kestrel
Peregrine	Osprey
	Merlin
	Hobby
	Goshawk

Common Buzzard compared to Rough-legged Buzzard at Falsterbo is due to a more southeasterly migration route (Dobler *et al.* 1991) in combination with the more northerly breeding range and a lower dependence on thermals in the latter species. The Eurasian Sparrowhawk is less dependent on thermals but avoid longer sea crossings and the relative proportion seen at Falsterbo is comparatively high (Table 1). Raptors like the harriers, Osprey and the falcons are less inclined to follow leading lines and use active flight to a higher degree. They thus generally occur to a much lower degree on the peninsula compared to the thermal migrants.

Differences between the ages

In Table 3 the relative proportions of the estimated Swedish population of adult and juvenile migrants passing Falsterbo are compared. In most species a higher percentage of juveniles are recorded. Different wintering strategies between the age classes, with adults generally spending the winter further north, explain the clear dominance of juveniles at Falsterbo in Red Kite, White-tailed Eagle, Goshawk and Eurasian Sparrowhawk (Kjellén 1994). In all the other raptors where adults occur in a lower proportion on the peninsula the most likely explanation is an age-dependent difference in migration strategy. Adults with their greater experience are less inclined to follow leading lines, show less hesitation to cross the sea and consequently generally migrate on a broader front and become less concentrated at Fal-

Table 3. Relative proportion of adults and juveniles among migrating raptors at Falsterbo 1986–1995.
Relativ andel adulta och juvenila bland sträckande rovfåglar i Falsterbo åren 1986–1995.

Higher proportion of adults *Högre andel adulta*	Equal proportion of the ages *Lika stor andel adulta och juvenila*	Higher proportion of juveniles *Högre andel juvenila*
Honey Buzzard	Montagu's Harrier	Red Kite
Rough-legged Buzzard	Common Buzzard	White-tailed Eagle
Peregrine		Marsh Harrier
		Northern Harrier
		Goshawk
		Eurasian Sparrowhawk
		Osprey
		Eurasian Kestrel
		Merlin
		Hobby

sterbo. In this group there is however a considerable variation from a very clear dominance of juveniles in the three small falcons to only a slight excess in the Osprey.

In two species, Montagu's Harrier and Common Buzzard, the age classes occurred in equal proportions at Falsterbo. Montagu's Harrier is a rather sparse migrant with an annual average of 10 individuals (Table 1), and it is possible that more data would reveal a dominance of juveniles like in the other two harriers. Also the proportion of immature non-breeders (second-year birds) was comparatively high (34 %) among the "adult" Montagu's Harriers at Falsterbo. On the other hand, the Common Buzzard is the secondmost common migrant. Although there may be differences in concentration rate between different years due to separate migration peaks in adults and juveniles, the excess of young birds was very slight in the whole material. Thus in this decided thermal migrant both age classes are about equally concentrated at Falsterbo.

The three species where a higher proportion of adults are seen, constitute one long-distance migrant (Honey Buzzard), one short-distance migrant (Rough-legged Buzzard) and the Peregrine where different populations vary from residents to long-distance migrants. Thus there is no general migration strategy explaining why these three diverge from the majority. Like other raptors the experienced adults would seem more capable of broad-front migration. Instead, in the Honey Buzzard ringing recoveries show adults to migrate on a more narrow front from Falsterbo towards Gibraltar, compared to a larger scattering among juveniles (Stolt *et al.* 1992). Thus it seems like the older birds use a favourite route that they have learned during earlier autumns. Martin Tjernberg (*pers. comm.*) has proposed the following explanation: "Breeding studies in Uppland indicate that in an average year one third of the pairs do not lay eggs and one third fail in their breeding attempt. With a total population of 6000 pairs this gives us 8000 adult Honey Buzzards. These birds start to move south through Sweden in August, but are still not in a great hurry. During the month there is a successive concentration in southern Sweden (Småland and northern Skåne), were food is still plentiful. These birds accumulate energy and await favourable migration conditions. When such weather arrives there is a marked migration peak at Falsterbo in late August-early September. The birds now migrate fast via Falsterbo and Gibraltar to their wintering grounds in tropical Africa".

In both Honey and Rough-legged Buzzard the proportion of juveniles was higher at Ottenby in the Baltic Sea compared to Falsterbo (Søgaard & Østerby 1989, Kjellén 1994), indicating a migration in a wider angle among young birds. This is the general picture among passerines, where ringing recoveries demonstrate a wider orientation scatter in juveniles compared to adults (Alerstam 1990b). Compared to the other two species the dominace of adults at Falsterbo is less pronounced in Rough-legged Buzzard. Since both population and reproduction figures are comparatively unsafe the species may actu-

ally belong in the group with equal proportion of the ages. The proportion of second-year birds among the adults at Falsterbo was only 7 % during the ten years and the addition of these would not change the observed proportion of adults. However the primary reason for keeping the species in this group is the observed significantly higher proportion of juveniles at Ottenby compared to Falsterbo described above. It seems likely that the adults in the three species in this group use their previous experience to follow established safe and efficient routes to the known winter quarters. This takes them past Falsterbo to a higher degree than the juveniles, finding their way to the unknown wintering grounds on their own during the first autumn migration. This makes these species especially vulnerable to persecution along the migration routes of the adults.

Fluctuations in the Swedish raptor populations reflected by the migration counts at Falsterbo

The proportion of the estimated Swedish autumn population of varies raptors seen at Falsterbo varied from 0 to 38 percent (Table 1). But how well are population changes reflected in the figures from the peninsula? Since the annual fluctuation in numbers can be rather large (Table 1), especially due to variations in the weather, longer series are needed to detect alterations in the population. Counts of the total number of different raptors at Falsterbo have been conducted 1942–1944 (Rudebeck 1950), 1949–1960 (Ulfstrand *et al.* 1974) and from 1973 onwards (Roos 1996). Although the older counts are not quite comparable the later series is conducted in a standardised way year after year. Thus the figures can be assumed to reflect the general population trends. Although species like Honey Buzzard, Common Buzzard and Peregrine clearly decreased between the 1950s and the 1970s, the population trend since 1973 has been positive in most species. Thus six raptors show a significant increase in annual numbers during the last twenty years (Roos 1996). In Marsh Harrier, Red Kite and Peregrine the increase is highly significant and well supported by population censuses during later years (Ahlén & Tjernberg 1996, Kjellén 1996a and b). Although less than 1 % of the Swedish autumn population of Goshawk pass Falsterbo, the increase in the small number of migrants can be assumed to mirror an increased population size, supported by the official protection in 1989. Eurasian Sparrowhawk and Osprey have also increased significantly at Falsterbo (Roos 1996). The former is now apparently the most common raptor in Sweden, although no population estimate has been published lately. According to Ahlén and Tjernberg (1996) the Swedish Osprey population has been stable to slowly increasing since the 1940s. However, in the southernmost province, Skåne, the numbers doubled to 60 pairs between the late 1970s and 1992 (Gierow 1992). Also in White-tailed Eagle and Montagu's Harrier the documented increase in later years (Ahlén & Tjernberg 1996) can be discerned in the small autumn figures from Falsterbo.

The two falcons Eurasian Kestrel and Hobby have occurred in relatively stable numbers at Falsterbo during the latest twenty years (Roos 1996), indicating comparatively stable populations. The Merlin increased between 1973 and 1986, but has since then decreased. In Rough-legged Buzzard the figures in the standardised counts varied considerably between years, most likely due to variations in the breeding success. During the last ten years the trend is however negative. Also at Ottenby, on the island of Öland in the Baltic, there has been a clear decrease in the number of migrating Rough-legged Buzzards during the same period (Jan Pettersson *pers. comm.*). In Padjelanta, Lappland the population was halved between 1982 and 1988 and especially the number of pairs actually starting a breeding attempt has decreased in later years (Christer G. Wiklund *pers. comm.*). My studies show that the decrease at Falsterbo is due to falling numbers of adult migrants, from roughly 1000 adults in 1986–87 to approximately 600 adults in 1994–95. Most likely this is a consequence of the lack of peak rodent years since 1982 (Hörnfeldt 1994 and *in lit.*). The poorer food supply may also have caused the general, though not significant, decrease in the number of migrating Northern Harriers at Falsterbo during the last twenty years (Roos 1996). Also Common Buzzard seems to be generally decreasing but Honey Buzzard is the only raptor showing a significant decline during the period (Roos 1996). Since there has been no negative trend in the proportion of juvenile migrants at Falsterbo (reflecting breeding success) (Søgaard & Østerby 1989, this study), and there seems to be no drastic changes of the breeding habitat during the period, the reasons for the decline is most likely found outside Sweden. Tjernberg & Ryttman (1994) calculated that the present production of young was enough to support a stable population not being affected by hunting. A drastic increase in the numbers shot on spring migration past Malta (Fenech 1992) may at least partly be responsible for the decline in Honey Buzzard numbers. This emphasis-

es the vulnerability of species with a high concentration effect.

While most raptors occur at too low densities to be followed via the Swedish breeding bird census programmes (Svensson 1995) the autumn counts of migrants at Falsterbo is a feasible and reliable way to follow the long-term changes of the Swedish populations. As can be seen above also changes in species occurring in low numbers on the peninsula are reflected in the counts. A comparison between National census results and the autumn figures at Falsterbo in Marsh Harrier showed that the proportion seen on migration was stable in the order of 4–5 % of the estimated autumn population from the late 1950s until 1995 (Kjellén 1996b). During this period the Swedish population increased from 200 to 1400 pairs. The correlation of the annual numbers at Falsterbo between this study and the standardised monitoring counts by Roos (1996) during the period 1986–1994 is highly significant for all species except Montagu's Harrier ($r = 0.73–0.98$, $p < 0.001–0.05$). The average figures are however between 38 and 214 percent higher in this study due to a better coverage. Also, the separation of adults and juveniles provides an advantage when analysing population changes.

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Sammanfattning

Betydelsen av en koncentrationspunkt för fågelflyttning: andel av den svenska populationen av olika rovfåglar som inräknades i Falsterbo 1986–1995 samt sträckräkningarnas värde som mått på populationsförändringar

Metoder

Rovfågelsträcket över Falsterbohalvön (Figur 1) räknades under perioden 1 augusti till 20 november 1986–1995. Observationer bedrevs från gryningen och så länge något påtagligt sträck noterades (normalt någon gång på eftermiddagen). Alla rovfåglar åldersbestämdes så långt möjligt. Observationsplats på halvön varierades efter vindriktning för att komma så nära de flyttande fåglarna som möjligt. De flesta räkningarna utfördes av författaren, oftast assisterad av andra observatörer goda sträckdagar. Ambitionen var att täcka in så stor del av sträcket som möjligt. De till åldern obestämda rovfåglarna räknades om efter andelen bestämda exemplar i varje tiodagars-period. Om till exempel 20 % av de åldersbestämda ormvråkarna under de sista tio dagarna i september var juvenila, antogs samma procentandel av de obestämda utgöras av ungfåglar och resterande 80 % av adulta.

Uppskattningar av det svenska beståndet av olika rovfåglar har hämtats från litteraturen, huvudsakligen SOF (1990) samt Ahlén och Tjernberg (1996). Som mått på det genomsnittliga häckningsresultat har flygga ungar/territoriellt par använts. Om möjligt har uppgifter hämtats från Skandinavien, men ifall sådana saknas har siffror tagits från övriga Västeuropa.

Resultat med kommentarer

Det samlade resultatet redovisas i Tabell 1. Med hjälp av populationskattningar och häckningsutfall har en genomsnittlig svensk höstpopulation beräknats. Det totala medeltalet i Falsterbo liksom det genomsnittliga antalet adulta respektive juvenila sträckare jämförs med det beräknade höstbeståndet för olika arter. I en del fall, där populationen för närvarande är i stark tillväxt, har medeltalet för de senaste fem åren använts. Bland de adulta sträckarna finns en varierande andel subadulta fåglar, vilka dock knappast påverkar den generella bilden. Främst bland de nordligare arterna förekommer med säkerhet även en del häckfåglar från Norge och Finland i Falsterbo.

Efter en sentida nedgång uppskattades bivråksbeståndet till 5000–6000 par 1995. Jämfört med andra rovfåglar är produktionen ovanligt låg, med i medeltal endast 0,6 ungar/par i en studie från Uppland (Tjernberg & Ryttman 1994). En tredjedel av den beräknade höstpopulationen räknades i Falsterbo, vilket är en jämförelsevis hög siffra. Till skillnad från flertalet arter var andelen inräknade ungfåglar klart lägre än andelen adulta sträckare. Återfynd av ringmärkta bivråkar visar på en större spridning bland ungfåglarna under höststräcket genom Europa, jämfört med gamla fåglar som sträcker mycket koncentrerat från Falsterbo ner mot Gibraltar (Stolt m. fl. 1992).

Det svenska gladbeståndet är huvudsakligen koncentrerat till Skåne och har ökat markant under den senaste tjugoårsperioden till 650 par 1995 (Kjellén 1996a). Som ett genomsnittligt mått för de senaste fem åren har 500 par använts. Ungproduktionen har varit stabilt hög med i medeltal 1,7 flygga ungar/häckande par de senaste 19 åren. Ökningen speglas mycket väl av sträcksiffrorna från Falsterbo. Om vi drar ifrån övervintrarna, som huvudsakligen består av adulta, observerades nästan 90 % av de glador som beräknas ha lämnat landet i Falsterbo.

Antalet havsörnar har ökat sakta till 150–195 par 1995 och ungproduktionen ligger på 0,6–0,8 ungar/par (Ahlén & Tjernberg 1996). De äldre fåglar som ses i Falsterbo består huvudsakligen av icke könsmogna subadulta örnar. Uppenbarligen minskar flyttningsbenägenheten med stigande ålder.

Mellan riksinventeringarna 1979 och 1995 steg antalet bruna kärrhökar från 500 till 1400 par (Kjellén 1996b). Detta speglas av ett högre medeltal i Falsterbo 1991–1995 (791) jämfört med de första fem åren i denna studie (488). Totalt 14 % av den beräknade höstpopulationen är en relativt hög siffra. Det är emellertid uppenbart att ungfåglarna koncentreras mer till Falsterbo (Tabell 1).

Den blå kärrhöken häckar främst i den nordliga taigazonen och beståndet skattades till mellan 1000 och 2000 par i slutet av 1970-talet (Nilsson 1981). Arten påverkas starkt av fluktuationer i gnagartätheten, vilket främst ger variationer i häckningsresultatet. Data från olika europeiska länder visar på 1,3–2,1 flygga ungar/par. Eftersom inga markanta gnagartoppar noterats i norra Skandinavien under perioden (Hörnfeldt 1994) har jag valt 1,8 ungar som ett medeltal, men detta kan vara i överkant. Även om häckare från övriga Fennoskandia kan förekomma är andelen som ses i Falsterbo betydligt lägre än hos brun kärrhök. Vidare är dominansen av ungfåglar mindre utpräglad.

Med en beräknad höstpopulation på 28 000 duvhökar är andelen i Falsterbo försvinnande liten. Majoriteten är stannfåglar eller flyttar endast inom Norden och det är nästan bara ungfåglar som lämnar landet.

Ingen sentida beståndsuppskattning har publicerats för sparvhök, men jag har räknat med 20 000 par efter en sentida ökning dokumenterad av sträcksiffrorna från Falsterbo. Trots att en hel del sparvhökar övervintrar är arten numera den mest talrika rovfågeln på halvön. Återfynd visar att såväl norska som finska fåglar passerar Falsterbo varför den beräknade andelen på 14 % kan vara något missvisande. Det är emellertid uppenbart att en betydligt större andel av ungfåglarna noteras på sträck.

En population på 19 500 par ormvråk bygger på uppskattningar från slutet av 1970-talet (Svensson 1979, Nilsson 1981), medan häckningsutfallet på 1,4 ungar/par kommer från en studie på Revingefältet i Skåne (Sylvén 1982). Även om en del ormvråkar övervintrar i sydligaste Sverige är huvudmassan flyttfåglar. Arten utnyttjar gärna termik och såväl adulta som juvenila koncentreras till Falsterbo i relativt hög grad.

Trots en uppskattad population på 7000 par häckar en del fjällvråkar inte under dåliga gnagarår (Nilsson 1981). Då ungproduktionen uppenbarligen varit relativt dålig under perioden har en relativt låg siffra på 0,7 ungar/par använts i beräkningarna. Fjällvråken är i högre grad än ormvråken sydostflyttare och andelen som inräknas i Falsterbo är klart lägre. Sträckräkningar vid Ottenby och studier av övervintrare i Skåne visar på en högre andel ungfåglar jämfört med denna studie (Kjellén 1994).

Enligt SOF (1990) häckade cirka 3200 par fiskgjusar i landet i början av 1980-talet och en produktion på 1,5 ungar/par redovisas av Odsjö och Sondell (1976). Fiskgjusen är en god flygare som inte koncentreras till Falsterbo i lika hög grad som många andra arter, men ungfåglarna uppträder i något högre utsträckning än gamla gjusar.

I slutet av 1980-talet beräknades minst 3000 par tornfalk häcka i Sverige (Ahlén & Tjernberg 1996). Framförallt nordliga häckare påverkas av variationer i gnagartätheten (Korpimäki 1985) och i Norge varierade häckningsutfallet per par mellan 1,9 ungar dåliga år och 3,7 ungar goda år (Hagen 1952). Endast mindre antal övervintrar i Sverige och endast 3 % (Tabell 1) antyder en låg koncentration till Falsterbo. Andelen inräknade ungfåglar var dubbelt så hög som motsvarande andel gamla tornfalkar.

Totalt 5000 par stenfalk och 1000 par lärkfalk uppskattades i slutet av 1970-talet (Nilsson 1981). Den förstnämnda producerar generellt fler ungar men fluktuerar beroende på gnagartillgången (Hagen 1952). Båda arterna använder sig främst av aktiv flykt under sträcket och koncentrationen till Falsterbo är relativt låg. Dominansen av ungfåglar är ännu mer utpräglad än hos tornfalk.

Den svenska populationen av pilgrimsfalk omfattade cirka 60 par 1994, vilka producerade i medeltal 1,7 ungar per häckningsförsök 1990–1994 (Ahlén & Tjernberg 1996). Sannolikt utgörs en hel del av sträckarna i Falsterbo av fåglar från de individrikare norska och finska populationerna, varför 11 % torde vara klart i överkant. Den dokumenterade högre koncentrationen av adulta pilgrimsfalkar kontraste-

rar klart mot förhållandet hos de tre mindre falkarterna.

Diskussion

Stannfåglar som kungsörn och jaktfalk saknas i princip i Falsterbo och även för arter som havsörn och duvhök är den låga andelen i Tabell 1 en följd av att majoriteten tillbringar vintern längre norrut. Generellt registreras arter med en sydligare utbredning (där majoriteten häckar närmare Falsterbo), som glada och brun kärrhök i högre utsträckning än nordliga häckare som blå kärrhök och fjällvråk. Annars är den mest uppenbara förklaringen till den varierande andelen av olika arter flyttningstekniken. Termikflyttare som bivråk, glada och ormvråk undviker längre havspassager och koncentreras i högre grad till Falsterbo jämfört med aktiva flygare som kärrhökar, fiskgjuse och falkar. Den högre andelen ormvråk än fjällvråk förklaras troligen av en mer sydostlig flyttningsriktning (Dobler m. fl. 1991), i kombination med en nordligare utbredning och något mindre beroende av termik hos den senare.

Hos flertalet rovfåglar räknades en högre andel av ungfåglarna i Falsterbo (Tabell 3). Detta kan bero på att adulta övervintrar längre norrut (som hos glada, havsörn och duvhök) eller att de mer erfarna vuxna fåglarna är mindre benägna att följa ledlinjer och därmed blir mindre koncentrerade till halvön. Hos ängshök och ormvråk räknades ungefär lika stor andel av de olika åldrarna, medan tre arter uppvisade en högre andel adulta (Tabell 3). Då bivråken är långflyttare, fjällvråken kortflyttare och pilgrimsfalken varierar från stannfågel till långflyttare finns inga likheter i flyttningsstrategi. Istället förefaller det som om de adulta fåglarna hos alla tre arterna använder sin tidigare erfarenhet för att följa en effektiv och säker väg till övervintringsområdet. Detta för dem då förbi Falsterbo i högre grad än de oerfarna ungfåglarna. Hos såväl bivråk som fjällvråk antyder återfynd och sträckstudier en sydflyttning på bredare front hos ungfåglarna.

Räkningar av sträckande rovfåglar på Falsterbohalvön har bedrivits sedan början av 1940-talet (Rudebeck 1950, Ulfstrand m. fl. 1974). Sedan 1973 utförs standardiserade räkningar i Naturvårdverkets regi på Nabben från gryningen till 14.00 under perioden 11 augusti till 20 november (Roos 1996 och tidigare). Då de årliga fluktuationerna kan vara relativt stora, främst beroende på väder och vind, krävs längre serier för att man ska kunna uttala sig om populationsförändringar. Även om bivråk, ormvråk och pilgrimsfalk minskade klart mellan räkningarna på 1950- och 1970-talen har utvecklingen sedan 1973 varit positiv för flertalet rovfåglar. Sålunda uppvisar sex arter en signifikant uppåtgående trend de senaste tjugo åren (Roos 1996). Ökningen hos glada, brun kärrhök och pilgrimsfalk stöds väl av sentida inventeringar (Ahlén & Tjernberg 1996, Kjellén 1996a, b). Fast mindre än en halv procent av den svenska höstpopulationen av duvhök passerar Falsterbo, kan den signifikanta ökningen av det lilla antalet sträckare antas spegla en populationuppgång, understödd av skyddsjaktens avskaffande 1989. Även sparvhök och fiskgjuse har ökat i Falsterbo. Åtminstone i Skåne har en klar ökning av antalet häckande fiskgjusar konstaterats i sen tid (Gierow 1992). Även för havsörn och ängshök finns en dokumenterad ökning på senare år antydd i siffrorna från Falsterbo.

Hos de tre mindre falkarna pekar sträckräkningarna på relativt stabila antal under de senaste tjugo åren (Roos 1996). För fjällvråk visar de standardiserade räkningarna en stor årlig variation som kan förmodas spegla häckningsresultatet, men för de senaste tio åren är trenden sjunkande. Denna studie visar att nedgången beror på ett sjunkande antal adulta sträckare från cirka 1000 fåglar 1986–87 till runt 600 fåglar 1994–95. Detta är sannolikt en konsekvens av bristen på utpräglade gnagartoppar sedan 1982 (Hörnfeldt 1994). Det sämre näringunderlaget kan även förklara ett minskande antal sträckande blå kärrhökar de senaste tjugo åren (Roos 1996). Annars är bivråken den enda art som uppvisar en signifikant nedgående trend under denna period vilket möjligen hänger samman med ökad jakt på Malta under vårsträcket (Fenech 1992).

Eftersom de flesta rovfåglar häckar i för låga tätheter för att kunna följas genom Svenska Häckfågelstaxeringen (Svensson 1995) är hösträkningarna i Falsterbo för närvarande det främsta medlet för att följa förändringar i de svenska populationerna. Som framgår ovan speglar Falsterbosiffrorna populationssvängningar även hos mer sparsamma sträckare. En jämförelse med riksinventeringarna av brun kärrhök visar att en konstant andel på 4–5 % av den beräknade höstpopulationen räknades i Falsterbo från slutet av 1950-talet fram till 1995 (Kjellén 1996b). Korrelationen av de årliga antalen mellan denna studie och de standardiserade räkningarna är signifikant för alla arter utom ängshök även om de genomsnittliga årssiffrorna ligger mellan 38 och 214 % högre på grund av en bättre täckning. Dessutom medger separeringen av unga och gamla fåglar en säkrare grund för analys av populationssvängningar.