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Wintering White-tailed Eagles *Haliaeetus albicilla* in The Netherlands: aspects of habitat scale and quality

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The coastal wetlands of The Netherlands have always served as winter haunts for juvenile and immature White-tailed Eagles from breeding populations further north and east. Even as these populations were at their lowest ebb by the 1960s and 1970s, each winter a few individuals showed up, invariably favouring large wetlands with a good supply of wintering, mainly herbivorous, waterfowl. An analysis of the presence of eagles in the wetland Oostvaardersplassen showed that wintering numbers as well as the duration of individual stays increased as a function of the number and biomass of waterbirds present. During the pioneering stage of this newly reclaimed area the dynamic vegetation produced huge seed supplies that attracted vast numbers of herbivorous waterbirds. The increase in eagle numbers in the Oostvaardersplassen reserve preceded the recovery of the northern and eastern breeding populations of White-tailed Eagles, but did not increase any further after reaching a maximum of 3–4 wintering birds, despite the fact that wintering numbers elsewhere in The Netherlands continued to rise in the wake of the increasing breeding population elsewhere in Europe. It is argued that 'core area' Oostvaardersplassen became saturated each winter in the 2000s. Additional eagles reaching The Netherlands spent the winter at alternative sites with smaller food supplies. In 1997–99, new waterbodies were created in the dry border zone of Oostvaardersplassen. The subsequent boost in waterbirds and fish may have triggered – in combination with the presence of undisturbed breeding habitat – the summering, and eventual breeding, of White-tailed Eagles from 2004 onwards. Water management towards improving dynamics in larger wetlands (both estuarine and riverine) may further boost food supplies for waterfowl and, hence, create suitable habitat for White-tailed Eagles elsewhere in The Netherlands.

Key words: wetlands, scale, dynamics, food supply, White-tailed Eagle, future perspectives

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The European breeding population of White-tailed Eagle *Haliaeetus albicilla* has been consistently low throughout much of the 20th century, especially during the 1960s and 1970s (Helander & Stjernberg 2002). After successive bans on the use of persistent pesticides in agriculture from the 1970s onwards most European sub-populations recovered spectacularly, following a distinct improvement of reproductive output (Helander *et al.* 2003).

The population increase boosted dispersal into western European wetlands, including The Netherlands. Although central and eastern European populations of the White-tailed Eagle mainly consist of non-migratory individuals, juvenile and immature birds dis-

perse after the breeding season, and are then also found wintering in large wetlands in western European countries (Helander *et al.* 2003).

In this paper we review the prehistoric, historical and recent status of wintering White-tailed Eagles in The Netherlands. Secondly, we explore the relationship between population trend in Europe in conjunction with the number of birds wintering in The Netherlands. Thirdly, we describe the relationship between habitat quality (in terms of food availability) and habitat use by eagles. Special emphasis is given to the number of wintering eagles and their duration of stay in the wetland reserve of Oostvaardersplassen, one of the main wintering haunts in The Netherlands throughout the period when European populations were at their lowest ebb. And finally, we consider the options for breeding in The Netherlands.

METHODS

The sheer size of White-tailed Eagles, and the large number of birdwatchers in The Netherlands, permit a more or less reliable annual record of numbers and distribution. We used data collected by SOVON Vogelonderzoek Nederland, researchers and reserve managers since the 1970s, in addition to published records (in Het Vogeljaar and Dutch Birding, and those submitted to www.waarneming.nl). In the province of Flevoland, including Oostvaardersplassen, eagle presence is derived from systematic raptor counts since 1970. Until 1983 these counts took place in February, since then more frequently. In the Oostvaardersplassen wetland (5600 ha), White-tailed Eagle presence has been recorded since the area was reclaimed from the former Zuiderzee in 1968 (van Dobben 1995). This nature reserve consists of a reed marsh with variable water level (3600 ha) and a, mostly dry, border zone (2000 ha) where wide ditches and shallow pools were constructed in the late 1990s to improve foraging and resting opportunities for waterbirds. Each year the duration of stay of individual wintering eagles has been registered in Oostvaardersplassen, in conjunction with relevant environmental factors such as availability and successional stages of major habitats and factors influencing succession (grazing by mammalian and avian herbivores, fluctuations in water level). Each of these factors may impact abundance and availability of potential food resources for top predators such as White-tailed Eagles.

Food choice of wintering White-tailed Eagles is described by way of analysis of pellets collected underneath roosting trees, and visual observations of foraging eagles. Monthly surveys, both airborne and on the ground from dams, dikes and transects, of waterbirds in Oostvaardersplassen were used to estimate the avian food supply in 1983–2007. Mammalian food – except Musk Rat *Ondatra zibethicus* and Brown Rat *Rattus norvegicus* – was either very scarce (Hare *Lepus europaeus* and Rabbit *Oryctolagus cuniculus*) or too large to catch (Roe Deer *Capreolus capreolus*). Carcasses of large herbivores were available for scavengers since the introduction of Heck Cattle *Bos taurus* (1984), Koniks *Equus verus* (1985) and Red Deer *Cervus elaphus* (1992), availability varying from a handful to many tens per winter (mostly Red Deer).

RESULTS

Trend in wintering numbers in The Netherlands

Archaeological excavations in low-lying parts of The Netherlands confirm the presence of White-tailed Eagles in the periods of 500 BC–1000 AD and 4000–2000 BC (Clason & Prummel 1978, Bakels & Zeiler 2005). The large number of bones found may indicate widespread occurrence in those days, but the species may also have been specifically targeted for prestige (as indicated by the preponderance of leg bones in the assemblages; Zeiler 2006). There is no evidence that the species was breeding in The Netherlands at the time.

In the first half of the 20th century annually several individuals visited the coastal zone of The Netherlands (including Zuiderzee – now Lake IJsselmeer and Flevopolders – and other inland regions, though less frequently) from October through March; juvenile and immature birds predominated (van Oordt & Verwey 1925, Eykman *et al.* 1941). This likely reflects the situation of past centuries.

Since the 1980s, in concurrence with the recovery of the European breeding population, wintering White-tailed Eagles in The Netherlands slowly increased, although numbers remained small. In 1945–78 1–4 individuals were observed each year (Bekhuis *et al.* 1999), with an average of 2.18 birds per winter (SD = 1.01). In 1979–96, wintering numbers have fluctuated between 3 and 12, with an average of 6.1 birds per winter (SD = 2.35). Since then, numbers have increased even further, involving at least 15–26 – mostly juvenile and immature – birds in the mid- and late 2000s (Fig. 1). This upsurge in wintering numbers was paralleled by the advent of summering in Oostvaardersplassen from 2004 onwards, a phenomenon that was hitherto unheard of except for the occasional single-day summer observation (Bijlsma *et al.* 2001).

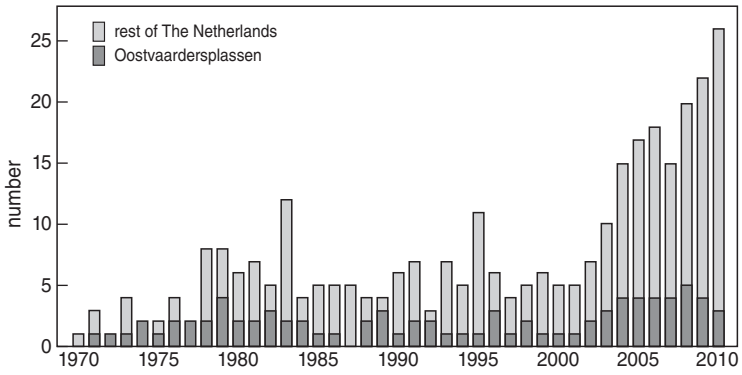

Figure 1. Number of wintering White-tailed Eagles in The Netherlands in 1970–2010 (Source: SOVON Vogelonderzoek Nederland, www.waarneming.nl).

Habitat selection of wintering eagles in The Netherlands

Within The Netherlands, White-tailed Eagles are mostly recorded in large open wetlands, except those in the peat districts of the north-western Netherlands. Until the mid-1980s, the majority of sightings came from Oostvaardersplassen and surroundings or from enclosed estuaries in the southwestern part of the country such as Biesbosch, Hollandsch Diep/Haringvliet and Grevelingen/Krammer-Volkerak. These areas were characterised by a large surface area of pioneer vegetation (often reedbeds *Phragmites australis*) and a large food supply attracting huge numbers of ducks and geese (van Eerden 1997).

In the 1990s White-tailed Eagles started to exploit other areas abounding in food in The Netherlands, such as the lakes bordering the polders of Flevoland that are presently hotspots for waterfowl in Europe (Noordhuis 1997, Nap 2009), Lauwersmeer and riverine habitats (Fig. 2). Forested regions on Pleistocene soils, such as the Veluwe in the central Netherlands, attract the occasional White-tailed Eagle on left-overs from hunting and traffic casualties (removed from roads and offered to scavengers at feeding stations; Bijlsma 2004) of Red Deer and Wild Boar *Sus scrofa*.

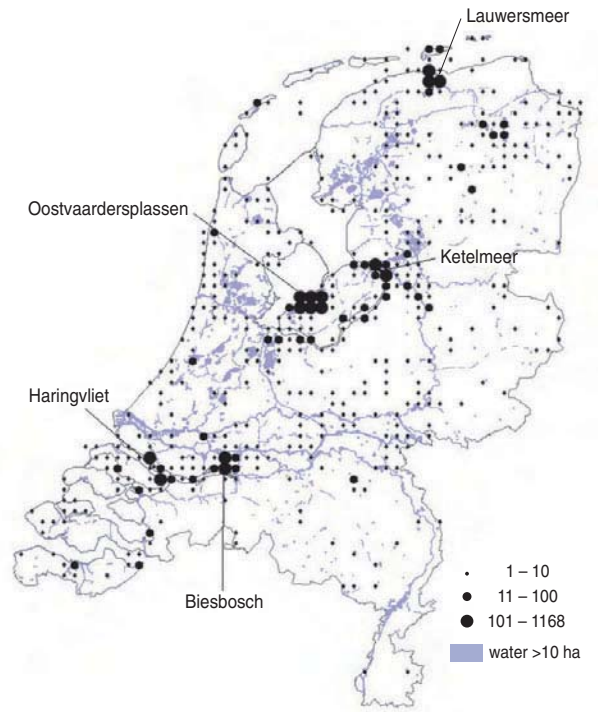

Figure 2. Distribution of White-tailed Eagles in The Netherlands in January 2000 – October 2010, expressed as summed number of individuals recorded per 5×5 km square (Source: www.waarneming.nl). No corrections made for observer intensity or repeated observations of the same individuals.

Eagle numbers in the Oostvaardersplassen

Since the area came into existence in 1968, wintering White-tailed Eagles were observed annually except in 1987 (Fig. 1). Up to four eagles have been using the area simultaneously (with a fifth bird in October 2004 and January 2008), but usually 1–2 birds were present up to and including 2002 and 3–4 birds in 2003–10.

Of the birds observed up to and including 1994, 75% were age-identified, of which 85% were in immature plumage (n = 32). This indicates that few birds could have visited the area for more than three years in a row. In later years, especially in the late 2000s when breeding commenced, wintering eagles consisted of the local breeding pair supplemented with one or two juveniles (not necessarily young from the local pair) and/or a subadult.

Food of wintering eagles in Oostvaardersplassen

In January–March 1991 34 pellets were collected at roosts in Oostvaardersplassen. Pellets were easy to recognise because of their size, which varied in length from 10–15 (20) cm. Hair was found in 25 pellets, mainly of Roe Deer (Table 1). Birds were quantified on

the basis of rectrices and primaries; Common Teal *Anas crecca* and Mallard *A. platyrhynchos* predominated in the pellets.

Direct observations of hunting eagles revealed the following prey species: Greylag Goose, Common Shelduck *Tadorna tadorna*, Common Teal, Eurasian Coot *Fulica atra*, Pheasant *Phasianus colchicus*, Carrion Crow *Corvus corone*, Song Thrush *Turdus philomelos* and Carp *Cyprinus carpio*. Up to the mid-1990s, eagles were occasionally seen outside the study area on offered bait, traffic casualties and victims of power lines.

Food supply and eagle abundance in the Oostvaardersplassen

The eagles in Oostvaardersplassen can choose to forage in wet marshland (3600 ha) or in grasslands and dry reedbeds interspersed with *Salix* bushes and *Sambucus* thickets (2000 ha). The wetland abounds in waterfowl (Platteeuw 1995, 1997, Platteeuw *et al.* 1998) and large fish species like Carp and Bream *Abramis brama* (Platteeuw 1994). The food supply in the dry buffer zone is smaller and consisted mainly of wintering geese and carrion. However, the creation of large waterbodies

Table 1. Food of White-tailed Eagles in Oostvaardersplassen in winter 1991, as found in pellets (n = 34; all mammals, expressed as number of pellets in which found, and some birds), and in the breeding seasons of 2006–10. In the breeding season, several methods of dietary studies were employed, i.e. prey delivered to the nest (webcam observations), pellet analysis (n = 4, expressed as number of pellets in which found), collecting prey remains on the nest during ringing and after fledging, and visual observations of prey transportations and prey captures (de Roder & Bijlsma 2006, 2008, 2009, 2010, de Roder *et al.* 2008).

Year	1991	2007	2006–10	2006–10	2006–10
Period	Jan–Mar	Feb–Jul	May–Jul	Mar–Jul	Mar–Jul
Method	Pellets, visual	Webcam	Pellets	Remains	Visual
Red Deer *Cervus elaphus*	0	0	0	1	0
Roe Deer *Capreolus capreolus*	20	0	0	0	0
Konik *Equus verus*	0	0	1	0	0
Musk Rat *Ondatra zibethicus*	3	6	0	0	0
Brown Rat *Rattus norvegicus*	0	0	0	0	0
Rat/Vole *Rattus/Microtus*	0	2	0	0	0
Hare/Rabbit *Lepus/Oryctolagus*	2	0	0	0	0
Mole *Talpa europaea*	0	1	0	0	0
Greylag Goose *Anser anser*	1	24	3	21	6
Eurasian Wigeon *Anas penelope*	2	0	0	0	0
Northern Shoveler *Anas clypeata*	0	1	0	8	1
Mallard *A. platyrhynchos*	6	0	0	4	0
Common Teal *A. crecca*	8	0	0	6	0
Dabbling duck *Anas* sp.	0	2	0	0	1
Great-crested Grebe *Podiceps cristatus*	0	1	0	0	0
Eurasian Coot *Fulica atra*	0	10	0	25	0
Rallidae	0	0	0	1	0
Northern Lapwing *Vanellus vanellus*	1	0	0	0	0
Eurasian Woodcock *Scolopax rusticola*	1	0	0	0	0
Common Redshank *Tringa totanus*	0	0	0	1	0
Black-headed Gull *Larus ridibundus*	0	0	0	1	0
Redwing *Turdus iliacus*	1	0	0	0	0
Common Starling *Sturnus vulgaris*	0	0	0	1	0
Bream *Abrama abramis*	0	0	0	2	0
Common Carp *Cyprinus carpio*	0	3	0	15	0
Roach *Rutilus rutilus*	0	0	0	1	0
Northern Pike *Esox lucius*	0	2	0	2	0
Pike/Pikeperch *Esox/Stizostedion*	0	0	0	1	0
Unidentified fish	0	13	0	0	0

in 1997–99 boosted waterbird numbers in this section of Oostvaardersplassen. Visual observations of hunting eagles revealed that some 80% of the records came from the wetland.

Since Oostvaardersplassen came into being, the presence of eagles in terms of eagle days per winter varied considerably. Two periods can be distinguished in which the duration of stays was rather prolonged, i.e. 1978–83 and 1988–92. Both episodes coincided with changes in water level management, resulting in massive recolonisation of mudflats by a palustrine vegetation. This pioneer vegetation in turn attracted large numbers of herbivorous waterfowl (Voslamber & Vulink 2010).

The number of eagle days correlated positively with the biomass of waterbirds (Fig. 3). Based on Fig. 3, it is estimated that the Oostvaardersplassen area could support up to 250 eagle-days per winter (corresponding to 3 individuals) if the food supply exceeded 35,000 kg of herbivorous waterfowl. In later years, numbers increased to 3–4, and occasionally 5 birds, and the birds gradually started to arrive earlier and to depart later until year-round presence was recorded for a single adult in 2004. This bird paired up with an immature in early October 2004, the pair summering in Oostvaardersplassen in 2005 (when the identity of the colour-ringed immature was established, i.e. a female ringed in May 2003 in Schleswig-Holstein, northern Germany; de Jonge 2005a, 2005b). The next year, breeding was a fact. This scenario was not surprising as waterbird biomass consistently exceeded 35,000 kg in each winter month (December–February) from 1999 onwards.

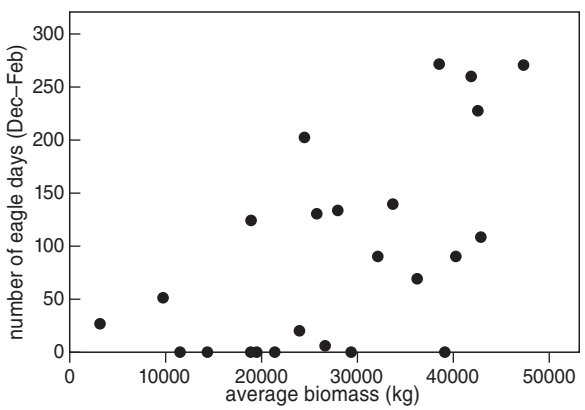

Figure 3. Number of eagle days (December–February) in relation to average available waterbirds (expressed as biomass) in Oostvaardersplassen in the winters of 1983/84–2006/07 (R^2 = 0.372, $P < 0.002$).

DISCUSSION

Trend of the breeding population in Europe

The European White-tailed Eagle population became critically endangered in the 1960s and 1970s when only some 1000 pairs were known (Helander *et al.* 2003). Use of organochlorines and heavy metals in agriculture caused widespread reproductive failure and high mortality, locally aggravated by poaching. After bans on persistent pesticides and seed dressings were imposed, breeding populations started to recover, notably from the late 1980s onwards. By the year 2000, the number of breeding pairs in Europe (excluding Greenland, but including European Russia) was estimated at 4107–4918, almost half of which occurred in Norway (Helander & Stjernberg 2002). By 2004, the populations in Germany and Poland had reached 470 and 600–670 pairs respectively (Hauff & Mizera 2006). Steep increases were also recorded in central European countries, notably from the early 1990s onwards (Probst 2009).

Trend in Dutch wintering numbers vs. size of European breeding population

The number of White-tailed Eagles wintering in Dutch coastal wetlands increased in the wake of the recovery of northern, eastern and central European breeding populations. However, the doubling of wintering numbers in The Netherlands between 1978 and 1983 (Fig. 1) preceded this recovery, and coincided with a food bonanza in Oostvaardersplassen. After this initial increase, wintering numbers of White-tailed Eagles remained more or less stable through the early 2000s. Consequently, the proportion of birds wintering in The Netherlands, expressed as a fraction of the European breeding population, showed a consistent decline (Fig. 4). This seemed to indicate that the carrying capacity of Dutch wetlands is limited, but the increase in the following years showed the potential of several other wetlands to attract one or more White-tailed Eagles for extended periods of time (e.g. Nap 2009).

Choice of wintering areas in The Netherlands

In the 1980s and 1990s, few regions in The Netherlands were visited by White-tailed Eagles for any prolonged period of time. Apart from Oostvaardersplassen this included the delta of the southwestern Netherlands. This region holds a number of wetlands and is still partly under the tidal influence of the North Sea and river dynamics; pioneer vegetations and farmland provide an abundance of food for herbivorous waterfowl (Meininger *et al.* 2004, van Eerden 1997,

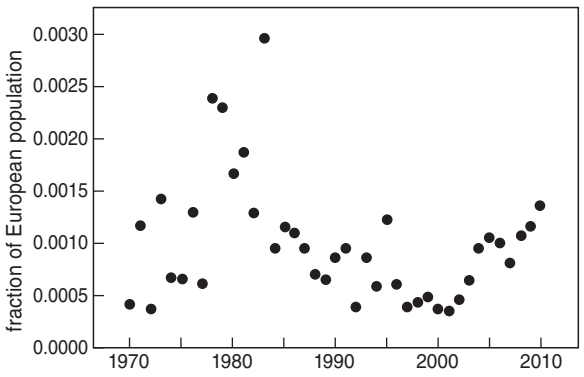

Figure 4. Wintering White-tailed Eagles in The Netherlands as a fraction of the European population (estimated as number of breeding pairs multiplied by 3) in 1970–2010.

Ouweneel 1997, 2004, Bijlsma *et al.* 2001). Other wintering sites are also characterised by high numbers of waterfowl and large wetlands, but despite scale and biomass available were not visited annually until the 2000s.

Food supply and duration of eagle stays

In the Oostvaardersplassen area, White-tailed Eagles are present each winter, but the duration of their stay varied considerably over the years. Longer stays coincided with peaks in primary production (Fig. 3). In 1976, the wetland was embanked with the aim to maintain and regulate summer water levels. This radical change in the dynamics of the system caused massive germination of *Typha latifolia* and *Ranunculus sceleratus*. The colonisation of *Typha latifolia* in the first few years after embankment attracted large numbers of Greylag Geese that fed on the rootstocks. In the 1970s up to about 10,000 Greylag Geese were wintering in the area.

In the second half of the 1980s, as vegetation succession proceeded, the marshland of Oostvaardersplassen lost a great deal of its vast food supply for herbivorous waterbirds. Wintering White-tailed Eagles responded by showing up in smaller numbers and by staying for shorter time spans. In 1987, the western part of Oostvaardersplassen was artificially desiccated, in the early 1990s again resulting in massive germination of palustrine vegetation like *Ranunculus sceleratus, Chenopodium rubrum, Tephroseris palustris* and *Rumex maritimus*. During this period, the area was visited by up to 150,000 Common Teal feeding on the seed bonanza (van Eerden 1997). In addition, large numbers of avian herbivores used the lakes as daytime roost, like Eurasian Wigeon *Anas penelope*, feeding on neighbouring grasslands at night. In autumn, large numbers of Mallard and Northern Pintail *Anas acuta*, which foraged on cereal stubble (notably in the early 1980s; van Rijn 1997), used the area as roosting and resting place. Following this renewed increase in prey availability, wintering White-tailed Eagles increased again, both in numbers and in duration of their stay. Similarly, the creation of shallow wetlands in the dry section of Oostvaardersplassen in 1997–99 again increased the extent of foraging habitat for waterbirds (Bijlsma 2008), perhaps promoting longer eagle stays.

Although waterbirds seem to be a major prey for wintering White-tailed Eagles in Oostvaardersplassen, our food sample is small and likely biased (mostly based on pellets, with some visual observations in addition; Table 1). During the breeding season, the eagles of Oostvaardersplassen showed a more diverse diet, with a preponderance of waterbirds but including rats and fish (Table 1). Prey lists from (mostly breeding) birds in Norway, Sweden, Finland, Austria, Germany and Poland also showed a preponderance of birds and fish (reviews in Fischer 1959, Mizera 1999, Probst 2009). The relative importance of carrion in winter is not well understood, as high proportions of carrion in diets are usually associated with feeding stations (to provide non-contaminated food where natural prey species show high levels of DDT, DDE or PCBs; Helander 1985). Furthermore, most food studies have employed only one of several methods to enumerate prey choice (prey transportation, prey remains on nests, pellets or camera observations, each leading to a – more or less – biased prey list; Mizera 1999), or have been restricted to the breeding season (Struwe-Juhl 1996).

Development in The Netherlands since the mid-1990s

The present study indicates that White-tailed Eagles wintering in The Netherlands are attracted to high concentrations of, mainly herbivorous, waterbirds in lowland wetlands. Such wetlands are characterised by an abundant food supply, consisting mainly of plants, roots and seeds of pioneers and helophytes typical of dynamic ecosystems (fluctuating water levels, tidal influences and/or salt stress). As long as the number of wintering White-tailed Eagles in The Netherlands remained small, most stayed at Oostvaardersplassen, apparently the area that best combined the prerequisites of scale and food availability. The carrying capacity of this wetland did not appear to sustain more than four birds, as evident from the stable numbers in Oostvaardersplassen in comparison with the increase of wintering numbers in The Netherlands since the 1990s

Figure 5. Adult male White-tailed Eagle in low flight crossing the extensive reedbeds of Oostvaardersplassen. This bird started summering in Oostvaardersplassen in 2004, and bred for the first time in 2006. The photograph was taken from a height of 150 m, during a waterfowl count from the air on 16 April 2008. Photo by Mervyn Roos.

(Fig. 1). As a consequence, alternative sites came into use and were exploited for increasingly longer time intervals (Ouweneel 2004), mostly in southwestern estuarine areas, the Biesbosch (a former brackish tidal area) and Hollandsch Diep/Haringvliet, in the Dutch Wadden Sea (Lauwersmeer), in lakes bordering Flevoland (notably Zwarte Meer, Veluwemeer, Drontermeer, Vossemeer, Ketelmeer), in river and brook valleys (Waal, IJssel, Peizer- and Eelderdiep) and in sparsely populated polders interspersed with lakes in the provinces of Friesland, Groningen, northern Drenthe and Zuid-Holland (Fig. 2). Elsewhere in low-lying parts of The Netherlands, juvenile and immature White-tailed Eagles have become a frequent, though fleeting asset outside the breeding season, passing by or staying for one or few days only. Many such sites are small, lack a dynamic ecosystem, have a limited food supply and are prone to frequent human interference. For wetlands to sustain wintering White-tailed Eagles, a large scale, a sufficient degree of dynamics, an abundant food supply (mainly herbivorous waterbirds) and restricted human disturbance are a *conditio sine qua non*. The (former) estuaries of Lauwerszee and Dollard along the Wadden Sea and in the southwestern Rhine–Meuse delta offer likely opportunities in this context because they are large and (potentially) subject to tidal dynamics. The river systems are also potentially favourable wintering haunts, at least when the natural floodplain is restored to its original size and dynamics are allowed to play a significant role. Since restoration of the Dutch river systems is being planned by the Dutch government, primarily as a means of creating a more sustainable management of peak discharges, opportunities for White-tailed Eagles may improve in the future unless simultaneously human disturbance is boosted via recreation. In the closely related Bald Eagle *Haliaeetus leucocephalus* it was shown that winter distribution along the Colorado River did not correspond to estimates of prey abundance, but was inversely correlated with human activity (Brown & Stevens 1997). Similarly, Thompson & McGarigal (2002) found that breeding Bald Eagles exhibited strong selection for areas with less human

activity at all spatial scales studied. Bald Eagles are extremely sensitive to the proximity of human activities and generally avoid contact with humans (McGarigall *et al.* 1991). In this respect it should be noted that Oostvaardersplassen is largely devoid of human disturbance (human activities are mostly restricted to research, culling of large herbivores and surveillance in the dry border zone; Bijlsma 2008), presumably another asset that makes the area suitable for prolonged wintering and for nesting.

Postscript: from wintering to summering to breeding

During summer, moulting and breeding Greylag Geese, herbivorous ducks, Cormorants *Phalacrocorax carbo* and fish abound in Oostvaardersplassen (de Roder & Bijlsma 2006), providing an abundant food supply. White-tailed Eagles were therefore expected to start summering (and eventually breeding) in the wake of the slowly expanding breeding range of German White-tailed Eagles (Bekhuis *et al.* 1999, Hauff & Mizera 2006, Struwe-Juhl & Grünkorn 2007, Sulawa *et al.* 2009). A summering White-tailed Eagle was first recorded in 2004 (de Jonge 2005a), and in 2005 a pair comprising an unidentified adult male and an immature female settled permanently in Oostvaardersplassen (Fig. 5). Presumably this pair (confirmed for colour-ringed female, likely for male) started nest building in the winter of 2005/06, and subsequently nested successfully in 2006 (raising one chick; de Roder & Bijlsma 2006), and again in 2007 (one female chick fledged; de Roder *et al.* 2008), in 2008 (two chicks fledged, male and female; de Roder & Bijlsma 2008), in 2009 (2 eggs laid, one chick – a male – fledged; de Roder & Bijlsma 2009), and in 2010 (1 female chick fledged; de Roder & Bijlsma 2010). During the breeding season this pair foraged on a variety of small mammals, birds and fish (Table 1).

Since 2005, White-tailed Eagles have also been recorded in the northern Netherlands in summer, notably Lauwersmeer and surroundings, along the river IJssel and in lakes bordering IJsselmeer in the central Netherlands, and Ventjagersplaten (Haringvliet) in the southwestern Netherlands. These birds were in their first or second year of life when summering for the first time, although a subadult resided at Friesche Veen and nearby polders (northeastern Netherlands) throughout the winter of 2006/07 up to early March. In several of these regions reserves have been created in recent years to enlarge existing reserves and to restore floodplain systems. Farmland was converted into rough pasture and wetlands, and artificial islands were created in lakes to provide (colonial) breeding birds a habitat free of mammalian predators. These activities led to higher dynamics and were associated with higher bird numbers (de Roder & van Wijhe 2005, Gerritsen 2006). Similar management is presently being implemented in the border zone of the provinces Drenthe and Groningen around Leekstermeer and in the valleys of Peizer- and Eeldermade. For a raptor the size of a White-tailed Eagle enlargement of disturbance-free wetlands and nature reserves will presumably be crucial to facilitate prolonged wintering, and especially so if the species is to spread its wings as a breeding bird across The Netherlands. By 2010, the prospects are favourable. Apart from the breeding pair in Oostvaardersplassen, new pairs settled and bred in Lauwersmeer (nest built in 2009, first breeding attempt failed in 2010), in the border lakes near Kampen (first nesting on Vogeleiland failed in 2010), and in Haringvliet (where an immature pair resided and displayed, but did not yet build a nest). In terms of scale, dynamics and disturbance-free zones precisely the areas expected to be colonised.

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SAMENVATTING

De Nederlandse wetlands hebben sinds jaar en dag gefungeerd als overwinteringsgebied voor juveniele en onvolwassen Zeearenden uit noordelijke en oostelijke broedgebieden. Zelfs toen deze populaties in de late jaren zestig en de jaren zeventig waren gecrasht, doken elke winter enkele exemplaren in de Nederlandse wetlands op, steeds in grootschalige gebieden met forse aantallen van vooral plantenetende watervogels. Een analyse van het voorkomen van de arenden in de Oostvaardersplassen (ontstaan in 1968) laat zien dat de overwinterende aantallen en de duur van hun verblijf toenamen als een functie van de aantallen en de biomassa van aanwezige watervogels. Deze waren, op hun beurt, afhankelijk van de dynamiek van het gebied, die op gezette tijden leidde tot immense voorraden van plantaardig voedsel (blad, wortels en zaden) van pionier- en helofytenvegetaties. De arenden namen hier al in aantal toe voordat de noordelijke en oostelijke broedpopulaties zich vanaf de late jaren tachtig begonnen te herstellen. Toen dit herstel echter in de jaren negentig goed zijn beslag kreeg, namen de aantallen in de Oostvaardersplassen niet verder toe. Het lijkt erop dat dit gebied als winterkwartier 'verzadigd' was geraakt en dat het zelfs bij een maximale dichtheid van watervogelbiomassa niet meer dan 250 arenddagen per winter kon onderhouden. De extra aantallen jonge vogels die als gevolg van de populatiegroei in recente tijden naar ons land komen, en in de toekomst zullen gaan komen, zien zich dus gedwongen om te zien naar alternatieven, die waarschijnlijk nog sneller 'vol' zullen raken. Enige hoop gloort in de recente trend in het waterbeheer, waarbij onze watersystemen meer ruimte en meer dynamiek zijn toegedacht. De daaruit voortvloeiende betere voedselcondities voor watervogels, en daarmee ook voor overwinterende Zeearenden, resulteerden in een langere verblijfsduur van meer Zeearenden en uiteindelijk, bij de verdere groei en westwaartse uitbreiding van de Duitse broedpopulatie, in de vestiging als broedvogel in Nederland in 2006. Hoe de stand van de Zeearend, als overwinteraar en als broedvogel, zich verder zal ontwikkelen, hangt waarschijnlijk af van de ruimte en de rust die we de soort bieden, in het bijzonder grootschalige en dynamische wetlands met een groot aanbod van watervogels en – althans deels – gevrijwaard van menselijke activiteiten. Naast de Oostvaardersplassen zouden dat Lauwersmeer (vestiging als broedvogel in 2009, broedgeval in 2010), Leekstermeergebied, IJsselvallei, randmeren (broedgeval Zwarte Meer in 2010) en Deltagebied (paarvorming en balts in 2009/10) kunnen zijn.

Greylag Goose pair with a creche of goslings, border zone of nature reserve Oostvaardersplassen (April 2007). Goslings are an important prey for White-tailed Eagles. Photo by Frank de Roder.