The feasibility of reintroducing White-tailed Eagles *Haliaeetus albicilla* to West Norfolk and eastern England

Dr Tim Mackrill, Roy Dennis MBE, Dominic Buscall, Harry Buscall, Rod Pilcher, [redacted]

Version 2
April 2021

N.B. this version has been redacted for confidential information relating to funding and the specific location of White-tailed Eagles.

Contents

List of Figures

List of Tables

Project team

The project is a partnership between Ken Hill Estate and the Roy Dennis Wildlife Foundation.

Roy Dennis MBE

Roy Dennis is a field ornithologist and wildlife consultant, living in Moray; he has worked in the Highlands and Islands of Scotland since 1959, most notably at Fair Isle Bird Observatory and also as the RSPB's North Scotland officer 1970 -1990 working on the conservation of rare birds, especially Osprey and Golden Eagle and the reintroduction of lost species, including Red Kite and White-tailed Eagle, including the Isle of Wight sea eagle project started in 2019. His Roy Dennis Wildlife Foundation, established in 1993, is active on raptor conservation and reintroductions, and satellite tracking in UK and mainland Europe. He has served as a Main Board member of Scottish Natural Heritage and has served on the UK White-tailed Eagle steering group since its inception. In Scotland he has successfully restored five populations of Red Squirrels and pioneered the techniques. He is a writer, lecturer and broadcaster.

Dr Tim Mackrill

Dr Tim Mackrill's work with the Roy Dennis Wildlife Foundation includes various species recovery projects, including the reintroduction of White-tailed Eagle to the Isle of Wight commencing in 2019 and the second English Osprey translocation at Poole Harbour in Dorset. He managed the Rutland Osprey Project for the Leicestershire and Rutland Wildlife Trust for more than ten years and a key element of this role was to build and manage relationships with a range of different stakeholders in the local community. He completed a PhD on Osprey migration at the University of Leicester and also has a BSc in Ecology from the University of East Anglia.

Dominic Buscall

Dominic Buscall co-owns and manages the Ken Hill estate with his father, Harry Buscall (below). Dominic spent five years working in strategy consulting with L.E.K. Consulting. He created the Wild Ken Hill project in 2018, with the ambition of creating a national exemplar for land management. Wild Ken Hill has developed a

three-prong approach, performing rewilding, regenerative agriculture and traditional conservation methods side-by-side. Dominic co-led a project that successfully reintroduced Beavers *Castor Fiber* at Ken Hill in 2020. Dominic has a first-class undergraduate degree from Durham University and a Distinction in Management from Imperial College Business School.

Harry Buscall

Harry Buscall co-owns and manages the Ken Hill estate with his son, Dominic Buscall (above). Along with his experience in estate management, Harry has 25 years investment management experience. He has helped to develop the Wild Ken Hill project and has an undergraduate degree from Cambridge University.

Rod Pilcher

Rod Pilcher has been involved in the Wild Ken Hill project since its inception in 2018, providing strategic advice and management assistance in relation to the rewilding project as well as engaging with a wide range of experts, national bodies and local interest groups. Rod researched and co-led a project that successfully reintroduced Beavers at Ken Hill in 2020.

[redacted]

Immature White-tailed Eagle and Red Kite in Norfolk (by Tim Smith)

Executive Summary

The White-tailed Eagle *Haliaeetus albicillia* formerly bred throughout the British Isles and through western and southern Europe, as well as in northern Europe. But widespread and persistent persecution by humans drove the species to extinction in England by the early nineteenth century, with the last southern English pair nesting on the Isle of Wight in 1780. We propose to restore White-tailed Eagles to eastern England, through a reintroduction project based at the Ken Hill Estate in West Norfolk. This project should be seen as the second phase of the restoration of White-tailed Eagles to England, following the Isle of Wight reintroduction project, which began in 2019.

The project meets all the International and European criteria governing such programmes. It will fulfil part of UK's obligation to increase its biodiversity, where appropriate. Furthermore, the Government's 25 year Environment Plan launched on 11th January 2018 by the Prime Minister and the Rt Hon Michael Gove MP, Secretary of State for Environment, Food and Rural Affairs, identified the White-tailed Eagle as a species of interest for recovery. This project, like the one based on the Isle of Wight, aims to carry out that Government target. The release methods involved have been tried and tested in numerous successful bird of prey reintroductions worldwide, and the project team have extensive experience of this.

The Ken Hill Estate has been identified as an optimum location to release White-tailed Eagles in eastern England, and was also the chosen location for an earlier White-tailed Project led by Natural England but abandoned due to funding in 2009. The nearby Norfolk and Lincolnshire coast is highly suitable for White-tailed Eagles, given high prey availability throughout the year and availability of potential nest sites. Furthermore, the Ken Hill Estate is the location of a large rewilding, conservation and regenerative agriculture project which will afford a quiet location for the release and excellent loafing areas for young birds.

Although juvenile White-tailed Eagles from the Isle of Wight, and others from continental Europe have visited Norfolk in recent years, the lack of breeding White-tailed Eagles in eastern England makes it unlikely these wandering individuals will

remain to breed, particularly as the species shows strong conspecific attraction and natal philopatry and, as such, young birds usually prefer to breed within 50 km of their natal site. In these circumstances, reintroduction is the most effective means of restoring a breeding population. This, in time, is very likely to attract immigrant birds from other populations. The project will therefore act as a key way to increase metapopulation connectivity between the English population and those in the Netherlands and other parts of continental Europe, as well as the expanding Scottish and Irish populations. It should therefore be viewed in the context of pan-European conservation efforts for the species.

We aim to collect White-tailed Eagle chicks from nests in Poland where there is a widespread population of 1200-1500 breeding pairs, and transport them by air to Norfolk. They will be reared in specially designed avian cages before being released as soon as they can fly. Human contact throughout this period will be kept to an absolute minimum.

Like other European raptor reintroduction programmes, it is essential that we actively generate widespread local and national public support for restoring this magnificent bird to our skies and limit all forms of human disturbance to the released birds. We believe the restoration of White-tailed Eagles to the region will catch the public imagination and help generate support for the project and the natural environment as a key flagship species.

1. Project goals and justification

1.1. Aims and objectives

The principal aim is to re-establish a viable breeding population of White-tailed Eagles *Haliaeetus albicillia* in Norfolk and in nearby areas of eastern England, through the translocation and release of young Polish White-tailed Eagles at the Ken Hill Estate in West Norfolk. It should be viewed as the second phase of the restoration of White-tailed Eagles in England, following the initiation of a reintroduction project based on the Isle of Wight, in 2019 which is being undertaken by the Roy Dennis Wildlife Foundation, in partnership with Forestry England. The early stages of the project have exceeded our expectations and created significant positive public interest. Analysis of the diet and behaviour of the young eagles indicates very high natural food availability, including fish, waterbirds and mammals, in the wider English landscape.

We believe the reintroduction programme will enhance the long-term survival of the species by extending the range of the White-tailed Eagle population in southern and western Europe. It will provide metapopulation connectivity between the establishing population on the English South Coast with new and expanding populations in continental Europe, including the Netherlands (20+ pairs) and France (4+ pairs) with those in Scotland (140+ pairs) and Ireland (9-10 pairs).

Breeding White-tailed Eagles are a missing part of England's native biodiversity and were lost entirely through human activities. As such we believe we have a moral duty to restore them. The Government's 25 year Environment Plan launched on 11th January 2018 by the Prime Minister and the Rt Hon Michael Gove MP, then Secretary of State for Environment, Food and Rural Affairs identified the White-tailed Eagle as a species of interest for recovery. This project builds on initial efforts on the Isle of Wight to carry out this Government target.

White-tailed Eagles are an important flagship species in coastal ecosystems and if the project was to go ahead there is great potential to use them to highlight the conservation of these special places and to attract support for the wider conservation movement. They were once an iconic breeding species of coastal and inland

wetlands in England and we believe that we have a unique opportunity to restore them to eastern England through a reintroduction project. Furthermore, evidence from Scotland indicates that re-establishing White-tailed Eagles will benefit the Norfolk economy through increased tourism revenue.

All responsible reintroduction and recovery projects should meet the Guidelines for Reintroductions and other Conservation Translocations developed by the International Union for the Conservation of Nature (IUCN) (https://portals.iucn.org/library/efiles/documents/2013-009.pdf) and we believe that this project meets all of the criteria required of a conservation translocation aiming to reintroduce a species within its indigenous range. This feasibility report has been compiled according to the criteria laid out in the guidelines.

1.2. The White-tailed Eagle

The White-tailed Eagle, often known as the Sea Eagle, is the fourth largest eagle in the world. It is usually associated with sea coasts, rivers and larger freshwater lakes. They are iconic birds with a rather vulturine appearance; the broad wings are up to 2.5 metres in span. The females are larger and can weigh up to 5.5 kg while the males range up 4.5 kg. The adult plumage is unmistakeable; the brown body contrasting with a pure white tail and a pale grey head with a bright yellow bill. The young are brown all over including the tail and by annual moults they slowly attain the adult plumage over four to five years (Forsman 1999).

White-tailed Eagles are generalist raptors, often eating carrion such as dead mammals and birds as well as fish dead in the water and along tidelines. They are adept at stealing food from Otters *Lutra lutra* and from birds such as large gulls and Cormorants *Phalacrocorax carbo*. During the seasons they also hunt different live prey such as water birds, especially goslings, Coot *Fulica atra* and ducks; when fish are near the water surface they catch them in their talons but are not adapted to plunge fishing like Ospreys *Pandion haliaetus*. Shoaling Grey Mullet *Chelon spp.* are a likely prey in estuarine waters, while a range of freshwater fish are taken on large inland lakes in much of Europe. The recently released eagles on the Isle of Wight have hunted Grey Mullet in estuaries as well as, European Bass *Dicentrarchus*

labrax and Black Bream *Acanthopagrus butcheri* in the seas around the island. These marine fish have become the major food of the older eagles. One of the 2019 birds also learnt to catch Common Cuttlefish *Sepia officinalis* in the Solent during summer 2020.

Figure 1. Adult White-tailed Eagle in flight.

White-tailed Eagles build large stick nests, which can be constructed in trees, on rocky cliffs and even on the ground on small islands. The clutch is one to three pale eggs; both sexes incubate, but mostly the female. The incubation period is about 38 days and young fly for the first time at 10 to 11 weeks. The young stay with their parents for several months before becoming independent.

The White-tailed Eagle is distributed as a breeding bird over the northern Palearctic from Japan, Kamchatka and the Bering Strait in the east, to Germany, Scotland and Iceland in the west, extending to Greenland in the Nearctic zone. In the north, its range extends from the Barents Sea coasts roughly along 70° N through Siberia. In the south, it occurs from Croatia to the Caspian Sea and between 30° and 40° eastwards to the Pacific (Helander and Stjernberg 2002). Originally the European

distribution extended south to the North African coast but was exterminated principally by human persecution, with the last individuals on the island of Corsica in the 1950s. Except for some northern populations, territorial pairs are mainly sedentary whereas juveniles may move south or wander extensively. Migration and wintering areas include all countries in Europe, but the most significant areas concur within the breeding range. In Asia, small numbers winter south to North Korea, Taiwan, Pakistan and India (Helander and Stjernberg 2002).

1.3. History of the White-tailed Eagle in the UK

It is clear that the White-tailed Eagle was formerly widespread across all parts of southern and eastern England before suffering intense persecution during the Middle Ages, which led to its eventual extinction as a breeding species by the early nineteenth century (Love 2006).

The population in the United Kingdom was estimated to be as high as 1000-1400 pairs in 500 CE, with breeding pairs located throughout eastern England (Evans et al. 2012). Archaeological evidence indicates they were widely distributed across East Anglia. The earliest records date back to the Pleistocene but most come from Roman sites, indicating that they were widespread during this period (Yalden 2007) (Figure 2B). Similarly, an analysis of place names interpreted as indicating the presence of White-tailed Eagles, also indicates that the species occurred throughout the region (Evans et al. 2012) (Figure 2A).

White-tailed Eagles, like many birds of prey, were relentlessly persecuted, particularly during the latter part of the Middle Ages and the population declined sharply as a result. By the late eighteenth century only a few isolated breeding pairs persisted in England, with the last known pair in southern England breeding on Culver Cliff on the Isle of Wight in 1780 (Love 2006). By the beginning of the eighteenth century the species was extinct in England, although a pair bred on the Isle of Man in 1815 (Love 2006).

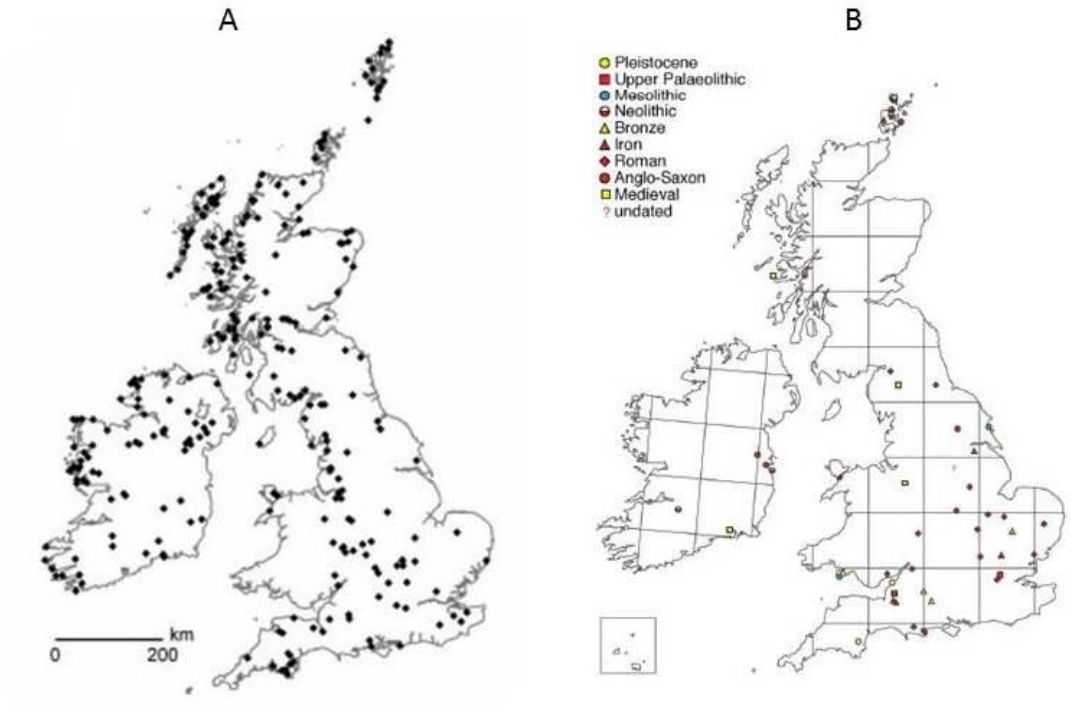


Figure 2. A) Geographical location of place names interpreted as indicating the presence of White-tailed Eagles (Evans et al. 2012); B) Map showing the archaeological records of White-tailed Eagles in the UK (Yalden 2007).

1.4. Why should White-tailed Eagles be re-introduced to eastern England?

This project provides an opportunity to restore a population of White-tailed Eagles to parts of its former range in eastern England from which it was eradicated entirely due to the influence of man. In a comprehensive review of the past status of the White-tailed Eagle in Britain, Yalden (2007) concludes, "…there is no doubt that White-tailed Eagles frequented lowland, southern Britain through Roman and Anglo-Saxon times. Historically, there is no reason to question the propriety of attempting to reintroduce the species to southern England."

The methods for the collection, care, translocation and release of juvenile White-tailed Eagles are thoroughly understood following the successful reintroduction projects that have been undertaken in Scotland and Ireland and the ongoing project on the Isle of Wight.

The project would also complement wider European efforts to restore the White-tailed Eagle to its former range. Reintroduction projects have been proposed for both northern and southern Spain. This would offer a welcome opportunity to share experiences and best practice.

Although the general trend for White-tailed Eagle in Europe is for populations to be increasing, the current European range remains extremely restricted compared to historical times. Range recovery is very slow because dispersal is limited by low natal dispersal distances of males in particular. Like many long-lived monogamous birds with delayed sexual maturity, White-tailed Eagles have a breeding system where males compete for resources in order to attract females, and hence there is a greater selective advantage for males to stay closer to their natal sites, whereas without the constraint of establishing a territory, females choose between the available resources of different males and consequently often disperse further (Whitfield et al. 2009). In an extensive study of the natal dispersal of the reintroduced population of White-tailed Eagles in Scotland, Whitfield et al. (2009) found that the mean dispersal distance for males was less than the females. Median age of recruitment to the breeding population was 4 years for males and 5 years for females, and median values for natal dispersal were 21–45 km in males and 47–58 km in females. This, however, varied according to the stage of the reintroduction project. Natal dispersal distances were identical among the males and females that bred following the first phase of releases; but as the population expanded, sex differences became more apparent with females dispersing further than males. This was exemplified by the fact that the mean terrestrial natal dispersal (i.e. straight-line distance between the release site and first breeding location minus any distance over sea) of breeding birds from the first Scottish release was 11 km for males and 11 km for females (full direct line distances (i.e. including areas of sea) 45 km / 47 km). The corresponding figures for wild-bred birds remained 11 km for males but rose to 26 km for females (full direct line distances 21km / 58 km).

Satellite tracking studies in England (as part of the Isle of Wight project), the Netherlands and Finland have shown that immature White-tailed Eagles wander extensively during their first two years in particular. This is exemplified by the fact

that one of the juvenile White-tailed Eagles from the Isle of Wight, G393, remained in West Norfolk (including the Ken Hill Estate) from 1st August 2020 to 4th January 2021 before returning south to the Isle of Wight. Another of the birds released in 2019 visited North Norfolk briefly in April 2020, and at least two-three other immature White-tailed Eagles, likely birds from continental Europe, were observed during spring and summer 2020. White-tailed Eagles are expanding their range in Europe and there are now 20 pairs in the Netherlands (S van Rijn pers. comm. 2020), but the North Sea is a considerable geographical barrier for a large bird with the morphology of the White-tailed Eagle. Although some dispersing individuals make the crossing - as exemplified by recent sightings of birds from continental Europe – the constraining nature of natal philopatry, and also strong conspecific attraction in the species (Whitfield et al. 2009), makes it unlikely that these wandering individuals will settle to breed, especially in the absence of a local breeding population. Establishing an initial population of 6-10 breeding pairs in eastern England would increase the chances of European birds remaining to breed. Despite the increasing population in the Netherlands our view is that natural recolonisation from the continent could take many decades, or even longer, to occur. Similarly, although birds from the Isle of Wight have visited Norfolk, they have since returned to the Isle of Wight. In these circumstances, reintroduction is the most effective means of re-establishing the species in the region and increase metapopulation connectivity and gene flow between different populations.

There will inevitably be mixing with individuals from the Isle of Wight project, but given that Ken Hill is located more than 270 km north-east, it is well beyond the expected natal dispersal of birds released on the South Coast. The restoration of Red Kites *Milvus milvus* to much of the UK was achieved through a series of well-planned reintroductions that have established various metapopulations in geographically distinct areas of the UK, and greatly speeded up the recovery of the species as a result. Establishing a second English release site for White-tailed Eagles at Ken Hill replicates this approach. Furthermore, we would welcome discussions with Natural England, and other key stakeholders, about the potential to establish a third English release site in the future.

The restoration of a breeding population of White-tailed Eagles in eastern England would restore a key apex predator to the area after an absence of several centuries. In recent years the positive ecological impact of such species has become increasingly apparent through the principle of trophic cascades (Estes et al. 2011), and also as key indicator species (Helander et al. 2008).

Apex predators such as White-tailed Eagles have been shown to maintain balance in ecosystems through a range of factors. This includes predation of abundant mesopredators, including, for example, corvids (Lourenço et al. 2014). The Common Buzzard *Buteo buteo*, is now the most numerous bird of prey in Europe (Mebs and Schmidt 2006), and recent research has shown that nestlings of this species have been repeatedly observed as prey items in the nests of White-tailed Eagles breeding in Germany (Neumann and Schwarz 2017). Similarly, Common Buzzard nestlings were present as prey items in 9.2% of White-tailed Eagle nests sampled for prey items (n = 249) or in the nests of 17% of sampled White-tailed Eagle pairs (n = 53) in Lithuania. This constituted 2% of all prey items identified. It was significant that Common Buzzards were less frequently observed as a prey item in nests located in coastal areas (3.6%, n = 139), where Common Buzzard abundance is 11.5 pairs per 100 km² and alternative prey availability is high, compared to nests inland (16.4%, n = 110) where the corresponding figure can be as high as 82 pairs per 100 km² (Kamarauskaitė et al 2020). Previous studies have demonstrated that White-tailed Eagles adjust their diet according to local prey availability (Ekblad et al. 2016) and the Lithuanian study indicates that Common Buzzard predation is most likely in areas where the species is locally abundant and alternative prey is reduced. There was no evidence of White-tailed Eagles preying on other mesopredators present in the study area, such as Northern Goshawk *Accipiter gentilis*, Honey Buzzard *Pernis apivorus*, Lesser Spotted Eagles *Clanga pomarina*, Black Kites *Milvus migrans* and Red Kite, indicating the local abundance of Common Buzzard, coupled with weak brood defence in the species, were key contributing factors (Kamarauskaitė et al 2020).

The broad diet of White-tailed Eagles, coupled with their tendency to take the most abundant prey items (Ekblad et al. 2016), means there is potential for them to supress the abundance of species at lower trophic levels, which may otherwise

remain unchecked. This has been evident in the Netherlands where the diet of the expanding population of White-tailed Eagles during the breeding season consists predominantly of waterbirds (53%) and fish (28%) (van Rijn and Dekker 2016). Greylag Goose *Anser anser* constitutes 38% of the waterbirds taken with Coot (34%) the next most frequently caught species. The eagles predominantly target Greylag Goose goslings, although sick or injured adult birds are also taken. This has had the effect of reducing numbers of these feral geese in many areas (van Rijn pers. comm. 2019). This evidence indicates that a reintroduced population of White-tailed Eagles would have a similar effect on the significant populations of Greylag and the non-native Canada Goose *Branta canadensis* in eastern England. The high numbers of both species, and Greylag Goose, in particular, is indicative of the fact that an apex predator is missing from the landscape, and, as such the project would restore an integral element of coastal and wetland ecosystems in the region.

The White-tailed Eagle is also regarded as an important flagship species for wetland conservation across Europe (Sandor et al. 2015), acknowledging the notion that the conservation of charismatic top predators brings wider biodiversity conservation benefits (Sergio et al. 2006). The restoration of such an iconic species would help to raise the profile of the conservation and protection of coastal and estuarine habitats which in turn may lead to knock on benefits for a much broader suite of threatened or declining species which share the same habitats. In this regard, the White-tailed Eagle could also be deemed an umbrella species, i.e. one whose habitat and area requirements are such that protecting it will aid a range of other species at the same time (Simberloff 1998).

In addition to the conservation and ecological case for the reintroduction of the White-tailed Eagle to eastern England, evidence suggests that it will also have economic benefits. In Scotland eagle tourism is extremely popular and recent RSPB commissioned reports have shown that the presence of White-tailed Eagles generate up to £5 million to the economy of the Isle of Mull each year, and £2.4 to the Isle of Skye through visitor spend in the area (Molloy 2011). Although the project team do not expect a boost to the local economy in West Norfolk of this magnitude due to the high levels of existing tourism, it is likely to add to the overall

attractiveness of the area for tourists, help mitigate high levels of existing seasonality, and is aligned to the area's "sustainable tourism" agenda.

1.5. Why Ken Hill and West Norfolk?

Many parts of East Anglia and eastern England are capable of supporting breeding White-tailed Eagles, and the Ken Hill Estate was originally selected as a potential release site by Natural England when efforts were made to reintroduce White-tailed Eagles to East Anglia over a decade ago. Now, having carefully considered the biological requirements of the species, as well as potential ecological and socio-economic impacts, we believe the site remains a highly-suitable release site, particularly in view of the pioneering approach the estate is taking to land management. The 4,000-acre estate is home to a pioneering project that combines rewilding, regenerative agriculture and traditional conservation in a mosaic of habitats, including mixed woodland, woodland pasture, heathland, scrub, and freshwater marshes. Evidence from the ongoing Isle of Wight project demonstrates that the young eagles prefer quiet wooded areas in a coastal location after release, and these requirements are met at Ken Hill. There is a secluded area with no public access for the release pens, and excellent loafing areas for the young birds. Furthermore, the estate's location adjacent to the Wash will provide a rich foraging area for the eagles, including in their first winter when carrion is a key element of the diet. One of the Isle of Wight birds, G393, was present in West Norfolk between 1st August 2020 and 4th January 2021, and favoured a wooded area [redacted]. This bird regularly flew out onto the mudflats in the Wash to feed on carrion during this period.

The Wash is the largest estuarine system in the UK, exceeding 60,000 hectares in area. It is fed by the rivers Witham, Welland, Nene, and Great Ouse, and comprises extensive saltmarshes, major intertidal banks of sand and mud, shallow waters and deep channels. The eastern end of the site includes low chalk cliffs at Hunstanton, and gravel pits at Snettisham which are an important hide tide roost for waders. The intertidal mudflats have a rich invertebrate fauna and colonising beds of glasswort Salicornia spp. which are important food sources for the large numbers of waterbirds dependent on this site (Ross-Smith et al. 2011). The sheltered nature of the Wash

creates suitable breeding conditions for shellfish, principally mussel *Mytilus edulis*, cockle *Cardium edule* and shrimps. These are principal food sources for some species such as Oystercatcher (Ross-Smith et al. 2011). To the north, the coastal habitats of the Wash are contiguous with Gibraltar Point SPA, whilst to the east the Wash adjoins the North Norfolk Coast SPA.

The Wash is one of the primary estuaries for wintering waterbirds in the UK, including internationally important numbers of 12 species (Frost et al. 2020). This importance is recognised and protected through its designation within the Wash and North Norfolk Coast Special Area of Conservation (SAC) and as a Special Protection Area (SPA), Ramsar Site, National Nature Reserve (NNR) and Site of Special Scientific Interest (SSSI). During winter the Wash attracts huge numbers of non-breeding waterbirds, with a five-year mean peak count of 381,498 individuals (Frost et al 2020). Notable wintering wildfowl species include Dark-bellied Brent Goose *Branta bernicla bernicla* (current five-year peak count mean = 13,545), Pink-footed Goose *Anser brachyrhynchus* (34,211), Wigeon *Mareca penelope* (12,172), Teal *Anus crecca* (2,905), and Shelduck *Tadorna tadorna* (2,250). Knot *Calidris canutus* are the most numerous wader (current five-year mean = 177,869), followed by Dunlin *Calidris alpina* (27,258), Oystercatcher *Haematopus ostralegus* (20,471) and Bar-tailed Godwit *Limosa lapponica* (18,579). Meanwhile the five-year mean for Black-headed Gulls *Chroicocephalus ridibundus* in the Wash is 16,467 (Frost et al. 2020). The high concentrations of wintering wildfowl and waders in and around the Wash mean that foraging eagles will regularly encounter bird carcasses, and they will also take any washed-up dead fish or marine mammals as they search shorelines for food. The second calendar-year White-tailed Eagle from the Isle of Wight that was present in West Norfolk between 1st August 2020 and 4th January 2021 was recorded behaving in this way on a regular basis. The Wash and North Norfolk coast is also one of the most important breeding areas for Common Seals *Phoca vituline*, supporting approximately 10% of the UK breeding population (www.wnnmp.co.uk). Dead seals will provide another source of carrion, and White-tailed Eagles are known to scavenge seal afterbirth in Scotland (D Sexton pers. comm. 2020).

Woodlands at Ken Hill and in the wider West Norfolk region would provide quite areas for breeding. Furthermore, many estates in the area are now incorporating re-wilding into their land-use (e.g. Westacre, Massingham Farms), and this will further enhance potential breeding habitat in future years.

Research indicates that the eagles are likely to settle within 50 km of the release site to breed where is ample suitable habitat, particularly in coastal areas, to support an establishing population of White-tailed Eagles within this range. The North Norfolk coast, with its mosaic of tidal rivers, estuaries, mud flats, sand flats, lagoons, marshes, and sand and shingle beaches will provide extensive foraging areas, while woodlands inland from the coast provide potential breeding sites. The White-tailed Eagle's preference for fishing in shallow water means that inlets and bays along the coast are likely to be favoured foraging locations. Marine fish species such as Thick-lipped Grey Mullet *Chelon labrosus*, Thin-lipped Grey Mullet, Golden Grey Mullet *Chelon aurata,* and European Bass *Dicentrarchus labrax* are a key element of the diet of White-tailed Eagles on the Isle of Wight. All of these species use sandbanks as nursery grounds for their young, and, are widespread along The Wash and North Norfolk coast as a result (wnnmp.co.uk). Sea Trout *Salmo trutta*, another potential prey species, are also present in Norfolk estuaries and along the coast.

The North Norfolk coast is also key wintering area for Pink-footed Geese, with a mean peak count of 44,505 (Frost et al. 2020). Large numbers of Wigeon (five-year peak count mean = 11,120), Dark-bellied Brent Goose (7,273) and Teal (6,280) are also recorded each winter along the coast between Holme-next-the-Sea and Salthouse, with waders including Knot (10,226) and Oystercatcher (5,713) also widespread. During summer large numbers of Greylag Geese breed along the coast with a mean peak count of 2,559 recorded during August (Frost et al 2020). Greylag Goose goslings have been shown to be a key prey item among the expanding population of White-tailed Eagles in the Netherlands (van Rijn and Dekker 2016) and they are also capable of catching adult birds, particularly if they are sick or injured (D Sexton pers. comm. 2020).

Further to the east, The Broads encompasses 303 km² of freshwater lakes, marshes and rivers to the east of Norwich and will provide further suitable foraging areas, with

nearby woodlands again providing potential breeding sites. Sites such as Ranworth Broad hold significant populations of breeding Greylag Geese (five-year peak count at Ranworth = 582 in June), as well as considerable populations of freshwater fish, which are a key prey items across Europe, including, for example, in the Netherlands (van Rijn and Dekker 2016), Lithuania (Dementavičius et al 2020) and Finland (Ekblad et al 2020). Species likely to be favoured by foraging White-tailed Eagles are predominantly slow-moving benthic feeders, such as Common Bream *Abramis brama* and Carp *Cyprinus carpio*, which are widespread and caught when they are in shallow water or close to the surface.

The Ouse Washes lies on the Norfolk-Cambridgeshire border, just under 50 km south-west of Ken Hill. It forms the largest area of washland in the UK and attracts large numbers of wintering wildfowl, including Wigeon (five-year peak count mean = 23,268), Whooper Swan *Cygnus cygnus* (8,063), Teal (7,972), Mallard *Anas platyrhynchos* (2,939) and Coot (2,718). Wintering waders include Lapwing *Vanellus vanellus* (9,426), Golden Plover *Pluvialis apricaria* (5,675) and Black-tailed Godwit *Limosa limosa* (2,972) (Frost et al. 2020).

The Brecks and Thetford Forest, situated 40-50 km south of the release site is also likely to be visited by the eagles after release. The dry heath and grassland of this region supports significant Rabbit *Oryctolagus cuniculus* populations, which have become a favoured prey item of Isle of Wight birds since release. Satellite tracking has shown the released eagles have, at times, frequented inland areas away from water for considerable periods, where lagomorphs are common; although breeding is most likely to occur close to water.

In the longer term, establishing a breeding population in the region will facilitate expansion of White-tailed Eagles along the Lincolnshire coast north of the Wash. The Humber estuary, situated 80 km north of Ken Hill, supports very large assemblages of wintering birds with a five year mean of 140,188 individuals. It supports internationally important numbers of twelve species, including Pink-footed Goose (five year peak mean count = 15,132), Shelduck (4,687) and Dark-bellied Brent Goose (3,401) and nine species of wader, with particularly large numbers of Golden Plover (32,113), Knot (22,500), Dunlin (15,941) and Lapwing (15,600) (Frost

et al. 2020). Further south in East Anglia, the Suffolk and Essex estuaries would provide rich foraging grounds for White-tailed Eagles and it is hoped that the population will eventually expand as far south as the Thames estuary.

The reintroduction of White-tailed Eagles is likely to bring further associated benefits to the area. As detailed above the White-tailed Eagle is regarded as an important flagship species for wetland conservation across Europe (Sandor et al. 2015) and the reintroduction of such an iconic species will help to generate more support for the conservation movement locally and help to highlight the importance of protecting sensitive coastal and estuarine habitats.

1.6. Have the causes of extirpation been removed?

White-tailed Eagles were lost due to widespread persecution, beginning with the protection of fishponds in the early Middle Ages, and later, when the population was small in England, through the collection of specimens for taxidermy and theft of eggs for collections. Public attitudes have now completely changed and the return of iconic species such as the White-tailed Eagle generates genuine excitement among the general public. The White-tailed Eagle is increasing across Europe and reintroduction projects in Scotland and more recently, Ireland, have been successful. The Isle of Wight reintroduction project has caused considerable interest among the general public, and support is high.

The White-tailed Eagle is now fully protected as a Schedule 1 species under the Wildlife and Countryside Act 1981 meaning it is an offence to intentionally or recklessly disturb it at, on, or near an active nest, or to shoot, poison or harm individuals at any time of the year. Nevertheless, cases of ongoing and illegal persecution do still occur with the species in Scotland and Ireland, and as such it will be essential to maintain a dialogue with those who may perceive eagles as an ongoing concern. The RSPB's map of confirmed raptor persecution incidents shows that since 2007 there have been 15 confirmed cases of raptor persecution in West Norfolk in relatively close proximity to Ken Hill, although none since 2015. This is indicative of the fact that illegal raptor persecution does still occur across England,

and emphasises the importance of taking a proactive approach to the dissemination of information about the movements of the White-tailed Eagles after release. All of the eagles released as part of the project will be satellite tagged, and as with the ongoing Isle of Wight reintroduction, a proactive approach will be taken whereby efforts are made by members of the project team to contact landmanagers when satellite data shows that a bird has settled in a specific area. This will aid monitoring of the released birds and ensure that landowners are able to contact the project with any questions or concerns. The locations of birds will not be made public when they settle on private land in order to avoid disturbance to the birds or current land use. The satellite transmitters that will be used by the project are solar powered and as such should have significant longevity. For example, a Golden Eagle satellite tagged by Roy Dennis in Scotland with a solar-powered GPS tag as a chick in July 2010 is continuing to provide high quality data over ten years later. It was encouraging that immature male G393 spent over five months in West Norfolk during autumn/winter 2020/21 with no conflict occurring, and the satellite tracking data provided invaluable in communicating the bird's movements to various landowners and other land managers in West Norfolk, including in areas where there have been confirmed cases of raptor persecution in the past. The Isle of Wight project has received valuable support from the RSPB investigations team, and we will liaise closely with them with regard to this project as well if it goes ahead.

Although White-tailed Eagles are experiencing a population recovery in much of Europe, anthropogenic factors in addition to illegal persecution are still a cause of significant mortality. For example, Isomursu et al (2018) determined mortality factors of 123 White-tailed Eagle carcasses recovered in Finland during 2000-2014. They found that human-related factors accounted for 60% of the causes of death. The most significant was lead poisoning (31% of all cases) followed by human-related accidents (e.g. electric powerlines and traffic) (24%). The temporal and regional patterns of occurrence of lead poisonings suggested spent lead ammunition as the source. Lead shot was found in the gizzards of some lead-poisoned birds. Similarly, post mortem examinations of more than 390 White-tailed Eagles found dead in Germany revealed that lead intoxication was the most important cause of death (23% of mortality) (Krone 2009). In these cases, scavenging behaviour exposes White-tailed Eagles to lead from spent ammunition. While it is illegal to use lead shot

over wetlands in the UK, lead is still the principal ammunition used for pheasant and partridge shooting, and, as such, juvenile White-tailed Eagles in particular are likely to be exposed to this after release. Monitoring of the Isle of Wight birds since release has shown that scavenged pheasants and partridges are an important element of the diet of first winter birds in particular. This is also the case in the Czech Republic (Belka and Horal 2009). However, as individual birds become better adapted at catching live prey the proportion of scavenged game carcasses in the diet declines in favour of live-caught prey, particularly fish. This shift in behaviour is described in further detail in section 4.3.4. This likely limits lead accumulation, but it is an issue that is being closely monitored and any birds found dead will be tested for lead at post-mortem.

It is encouraging that on 24th February 2020 countryside organisations issued a joint statement on the future of shotgun ammunition for live quarry shooting stating their desire to see an end to both lead and single-use plastics in ammunition used by those taking all live quarry with shotguns within five years. The phasing out of lead over this period will be of significant benefit to White-tailed Eagles and other birds of prey, such as Red Kites and Buzzards. The project will closely follow these developments, and the Game and Wildlife Conservation Trust (GWCT) will be invited to join the project steering group as a representative of the game shooting industry. The Isle of Wight project has received significant support from GWCT thus far.

Collisions with power lines are another significant cause of mortality for White-tailed Eagles (Isomursu et al 2018), and this was the cause of death of one of the juvenile White-tailed Eagles from the Isle of Wight in September 2020. There are no power lines in the vicinity of the release site for this reason.

Other means to reduce risks to juvenile, sub-adult and adult White-tailed Eagles are being assessed in an ongoing a disease/hazard risk assessment being undertaken by the Disease Risk Analysis and Health Surveillance (DRAHS) team at Zoological Society of London. This document will be submitted to Natural England separately.

1.7. Have White-tailed Eagles been reintroduced elsewhere?

White-tailed Eagles have been reintroduced to Scotland, Ireland, the Czech Republic and, most recently, on the Isle of Wight. Although the project in the Czech Republic was a small-scale release of only nine individuals (Belka and Horal 2009), the projects in Scotland, Ireland and the Isle of Wight provide valuable models.

In Scotland an early release was undertaken on Fair Isle in 1968, and although it failed it was a valuable test of translocation, husbandry and release methods. A total of 82 Norwegian young were subsequently released on Rum National Nature Reserve between 1975 and 1985, and this led to the first successful breeding in 1985. The population was relatively slow to expand and so an additional 56 birds were released between 1993 and 1998 using improved techniques (Evans et al. 2003). By 2000, there were 22 breeding pairs and the 100th chick had fledged successfully. Since then the population in Scotland, predominantly in western parts, has expanded to more than 140 breeding pairs (D Sexton pers. comm. 2020).

Following the successes in the west, 85 juvenile White-tailed Eagles were released on the east coast of Scotland between 2007 and 2012, with birds again imported from Norway. The first pair in eastern Scotland subsequently bred successfully in 2013, and there were four pairs in 2020 (O Selley pers. comm. 2020).

Figure 3. A juvenile White-tailed Eagle leaves the release pens on the Isle of Wight.

In Ireland, a total of 100 chicks were translocated to Killarney National Park in south-west Ireland between 2007 and 2012. There are now nine breeding pairs, of which four were successful in 2020, rearing five young. The breeding pairs included the first Irish-bred eagle to breed (A Mee pers. comm. 2020). A further ten Norwegian juveniles were translocated and released in 2020, at Lough Derg and Lower Shannon Estuary. These sites are located 118 km and 62 km from the original release site respectively, and it is intended that birds will be released for a further two years in order to bolster the Irish population (Mee 2020).

The Isle of Wight reintroduction began in 2019 with the release of six juvenile eagles. A further seven birds that were translocated from Western Scotland were released in July 2020. The experiences gained in both Scotland, Ireland and on the Isle of Wight will be used to inform the eastern England project.

Illegal persecution has been recorded in both Scotland and Ireland, with poisoning of released eagles a particular issue in Ireland (Mee et al. 2016). Although White-tailed Eagles take a diverse array of prey, there has been long standing debate in Scotland between conservationists and farmers as to the extent to which they predate lambs. This issue is assessed in detail later in this report. It is encouraging to note that despite initial concerns in Ireland, there have been no known cases of lamb predation, and the farming community is now either neutral or in favour of the reintroduction project (Mee 2017). There are also no conflicts with livestock farming of any kind in the Netherlands, where there is an expanding population of 20 pairs of White-tailed Eagles (see Appendix 2). To date there has been no conflict since the release of the first birds on the Isle of Wight in 2019.

1.8. What is the most appropriate donor stock?

The English population of White-tailed Eagles was from the nominate race *Haliaetus albicilla*, which is monotypic across Europe. This population would have once freely mixed with the White-tailed Eagles in other parts of the UK as well as mainland

Europe. Restoring a breeding population in eastern England would facilitate these links between meta-populations once again.

In Europe, the breeding population is estimated to number 9,000-12,300 breeding pairs (BirdLife International 2015). Europe forms 50-74% of the global range, with a global population size estimated to be between 24,200 and 49,000 mature individuals. The general trend across Europe is for the species to be increasing, as shown in Table 1. In recent years White-tailed Eagles have returned to both the Netherlands and France, with small but expanding populations in both countries.

Table 1. Current European population of White-tailed Eagles (Birdlife International 2015 and other sources).

Country	Number of breeding pairs	Trend
Austria	13-14	Increasing (I)
Azerbaijan	5-10	Unknown (U)
Belarus	85-105	Stable (S)
Bosnia & HG	5-10	U
Bulgaria	33-37	I
Croatia	135-165	I
Czech Republic	25-35	S
Denmark	100	I
Estonia	220-250	I
Finland	450	I
France	4	I
Georgia	2-3	U
Germany	628-643	I
Greece	8-10	S
Greenland	150-200	S
Hungary	226-271	I
Iceland	69	I
Ireland	10	I
Latvia	90-100	I

Lithuania	120-150	I
Moldova	0-2	U
Netherlands	20	I
Norway	2,800-4,200	I
Poland	1,200-1,500	I
Romania	55-75	I
Russia	2,000-3,000	U
Scotland	130+	I
Serbia	112-139	S
Slovakia	10-14	I
Slovenia	8-11	I
Sweden	550-700	I
Turkey	8-15	S
Ukraine	80-100	I

The ongoing reintroduction of White-tailed Eagles on the Isle of Wight involves the translocation of juveniles from Scotland. Although the Scottish population is continuing to increase and now stands at 140 breeding pairs (D Sexton pers. comm. 2020), we believe that it will be necessary to source birds from another European population while the Ken Hill and Isle of Wight projects run concurrently. When a potential reintroduction of White-tailed Eagles was first proposed for East Anglia more than ten years ago, agreements were in place to translocate birds from Poland under the supervision of Dr Tadeusz Mizera.

The White-tailed Eagle is the national bird of Poland and much loved and admired across the country. The Polish breeding population of White-tailed Eagles has been growing since the mid-1980s. At the end of that decade, it was estimated that there were 185-240 pairs (Mizera 1990), rising to 430-500 pairs by the late 1990s (Adamski et al 1999). The population now stands at approximately 1,200-1,500 breeding pairs (Mizera pers. comm. 2020). The highest population densities and abundance are found in the north-west, but breeding pairs occur across the whole of the country (Anderwald et al. 2013). In some regions in the north, the strong upward trend in the number of breeding pairs has slowed down or stopped as the population

nears carrying capacity and there is increased competition for nest sites and food (Anderwald et al. 2013).

In view of the continued increases in the Polish population of White-tailed Eagles in recent years, and some evidence of density dependent processes beginning to act on the population - indicating that it is nearing carrying capacity in some regions - we believe that this population remains the most appropriate donor stock. Dr Tadeusz Mizera has agreed to support the project through the collection of young in Poland and securing the necessary Polish permissions.

1.9. Impact on donor stock

A key consideration of any reintroduction project is to ensure that the removal of birds for translocation has no detrimental impact on the donor population. The Polish population is now extremely large and robust and has continued to grow in the years since an East Anglian White-tailed Eagle reintroduction was first proposed. With at least 1,200-1,500 pairs, it is clear that the removal of up to 12 young a year for a period of five years will have no discernible impact at a population level. Mizera (1999) has previously demonstrated that a productivity of 0.7 chicks per breeding pair is sufficient for local Polish White-tailed Eagle populations to remain stable, but annual productivity figures across Poland are consistently above this, ranging from 0.83-1.11 (Mizera 1999, HELCOM 2016). Thus, even based on the more conservative figure of 0.83, a population of 1,200 breeding pairs of White-tailed Eagles will produce 996 young per year. The removal of 12 young from this total would thus reduce overall productivity by just 0.01, to 0.82. We can be confident, therefore, that the removal of this number of young will have no detrimental impact on this large and robust population.

Figure 4. Juvenile White-tailed Eagle at ringing.

1.10. Legal requirements

The UK Government is required and encouraged to reintroduce extinct native species, as a signatory of the Rio de Janeiro Convention on Biological Diversity, the European Habitats Directive and the Berne Convention. The above proposal complies with the Recommendation No. R (85) 15 of the Council of Europe Committee of Ministers to Member States on the reintroduction of wildlife species, adopted in 1985.

At the International Conference Sea Eagle 2000 held in Sweden in September 2000, one of its eight resolutions was:

"**Encouraged** that White-tailed Eagle populations have recovered in major areas of the species' European range, but

noting with concern that this species is still endangered in many countries;

the International Symposium Sea Eagle 2000

recommends that this keystone species, valuable as an environmental indicator, requires effective conservation action to restore this species throughout its present and former range."

This project would concur with the above vision and would complement the ongoing Isle of Wight reintroduction project and proposals to restore White-tailed Eagles through the southern half of Europe to the Mediterranean region.

The collection and translocation of juvenile White-tailed Eagles from wild nests in Poland will require a licence from the Polish government, an export licence from Poland to the UK, a CITES licence, and an import licence to the UK. The project team will be careful to follow all required protocols and have the relevant permission in place well in advance of intended translocation, which will be shared with Natural England. We have extensive experience of translocating birds of prey across international borders having translocated juvenile Ospreys to two different regions of Spain, and also to Switzerland.

The project would require a licence from Natural England to release White-tailed Eagles at Ken Hill as the species is listed on Schedule 9 of the Wildlife and Countryside Act 1981. Members of the project team already have the relevant licences from the British Trust for Ornithology to fit rings, VHF transmitters and satellite transmitters to the birds.

Under international conventions and directives, the White-tailed Eagle is classified as follows:

- EU Birds Directive: listed in Annex I - species to be subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution.
- CITES Convention: listed in Appendix I – trade in specimens of these species is permitted only in exceptional circumstances.
- Bonn Convention listed in Appendix I – endangered migratory species and listed in
- Appendix II - migratory species to be subject of agreements.

- Bern Convention: listed in Appendix II – strictly protected species.
- The White-tailed Eagle is specially protected in the UK under Schedule 1 of the Wildlife & Countryside Act 1981, and is also listed on Schedule 9.

White-tailed Eagles is also on the Red List of Birds of Conservation Concern in the UK (www.bto.org/science/monitoring/psob).

2. The biological feasibility of a White-tailed Eagle reintroduction

2.1. Release site and the wider region

The Ken Hill Estate is located in West Norfolk on the east shore of the Wash. The estate consists of 4,000 acres of freshwater marshes, mixed woodland, woodland pasture, heathland, scrub, and arable farmland, south of Heacham. The estate is home to a pioneering land use project that combines rewilding, regenerative agriculture and traditional conservation. Evidence from the ongoing Isle of Wight project demonstrates that the young eagles prefer quiet wooded areas in a coastal location after release, and these requirements are met at Ken Hill. There is a secluded area with no public access for the release pens, and excellent loafing areas for the young birds. Further details regarding the specifics of the release site are included later.

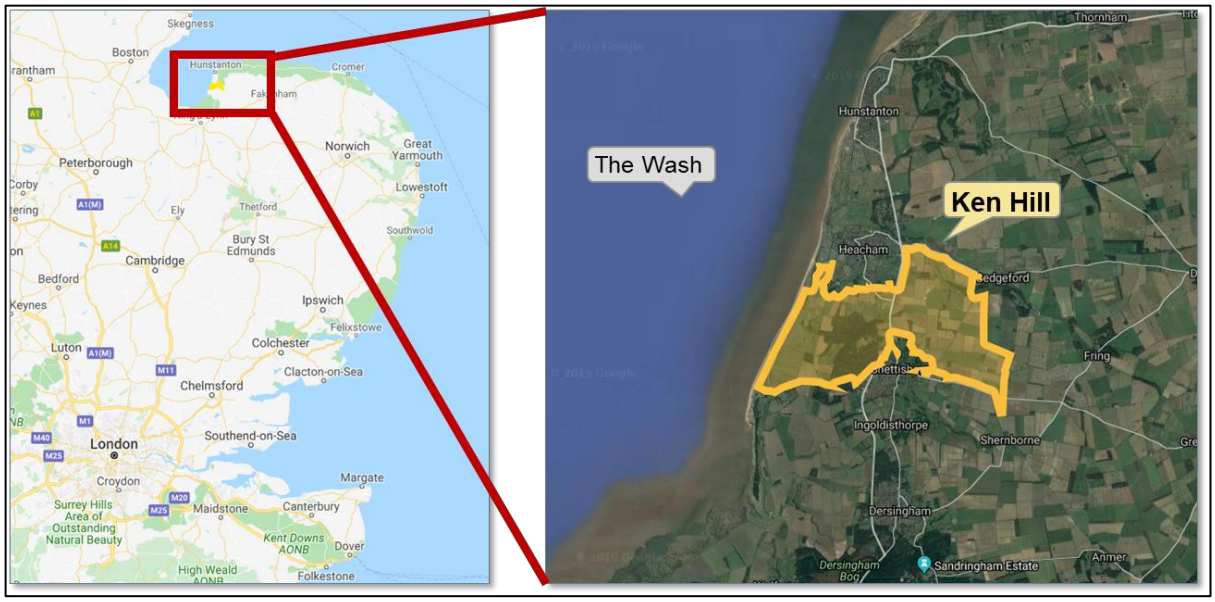


Figure 5. Location map of Ken Hill Estate.

Figure 6. Aerial photograph of freshwater marshes at the Ken Hill Estate.

The Wash itself is the largest estuarine system in the UK, exceeding 60,000 hectares in area, and is fed by the rivers Witham, Welland, Nene and Great Ouse. It comprises extensive saltmarshes, major intertidal banks of sand and mud, shallow waters and deep channels. The eastern end of the site includes low chalk cliffs at Hunstanton, and gravel pits at Snettisham which are an important hide tide roost for waders. To the north-east of Ken Hill, a mosaic of tidal rivers, estuaries, mud flats, sand flats, lagoons, marshes, and sand and shingle beaches running from Hunstanton in the west to Sheringham in the east forms a complex and ecologically rich North Norfolk coastline, extending over 50 km. The conservation significance of these two areas is reflected in their designation as Special Protection Areas (see below).

The wider West Norfolk region has an open, rolling topography which contrasts with the surrounding coastal fenland. The area comprises extensive arable cropping and some areas of mixed farming where the dominant livestock is pigs. Mixed woodlands are scattered throughout the region, and more extensive areas of mixed woodland are located to the south of Ken Hill in the Sandringham, Castle Rising, and West Acre area, north and east of Kings Lynn. A number of estates in the North West Norfolk region are now incorporating rewilding into their land-use (Westacre, Massingham Farms).

The area to the south-west of the Wash consists of low-lying fenland with many drainage ditches, dykes and rivers that slowly drain through reclaimed arable farmland towards the Wash.

A key factor regarding the suitability of Ken Hill as a release site is that significant proportions of the Norfolk and Lincolnshire coasts are managed as nature reserves, and this is reflected in extensive international designations. The Wash SPA covers 62,044 hectares in Norfolk and Lincolnshire and adjoins the North Norfolk Coast SPA which encompasses a further 7,862 hectares. In addition, the recently-designated Greater Wash SPA encompasses a c. 3,536 km² area of predominantly coastal waters running from Yorkshire in the north to Suffolk in the south. A network of nature reserves, managed by a rage of organisations are situated along the Norfolk coast from The Wash to Cley. These include The Wash NNR, Dersingham Bog NNR, Snettisham RSPB, Holme Dunes (Norfolk Wildlife Trust), Titchwell Marsh RSPB, Scolt Head Island NNR, Holkham NNR, Blakeney NNR and Cley and Salthouse Marshes (Norfolk Wildlife Trust). Inland, Roydon Common is managed by Norfolk Wildlife Trust and Sculthorpe Moor by Hawk and Owl Trust. In addition, the RSPB manage Frampton Marsh and Frieston Shore on the Lincolnshire side of the Wash, with Lincolnshire Wildlife Trust's Gibraltar Point situated just to the south of Skegness.

It is also important to recognise that local farmers and other private landowners also make an important contribution to nature conservation in the wider landscape, as exemplified at Ken Hill. They receive valuable support from Natural England to facilitate the effective targeting of Countryside Stewardship and other agri-environment schemes to deliver conservation benefits. This has significantly increased the conservation value of many areas and benefitted a number of species.

2.2. White-tailed Eagle diet

As a generalist predator, the White-tailed Eagle tends to exploit the most abundant prey (Ekbald et al. 2016). Fish, waterbirds, and small- to medium-sized mammals constitute the bulk of the diet (Cramp 1980), but the relative proportion of each varies

both spatially within the landscape and also seasonally (Ekblad et al. 2016, Dementavičius et al. 2020). Studies have shown that the composition of birds in the diet may vary from 6.7% in Greenland (Wille and Kampp 1983) to 88.4% at Lake Baikal in eastern Siberia (Mlíkovský 2009). In addition, carrion is opportunistically taken and can constitute a significant proportion of the diet during certain parts of the year. For example, carrion constitutes 29.5% of White-tailed Eagle diet during winter in Germany (Nadjafzadeh et al. 2015).

Overall diet is predominantly influenced by the relative abundance of potential foods, with eagles switching between species according to what are most readily available (Marquiss et al. 2004). Fish usually dominate the diet in spring and summer, with birds increasingly taken in autumn and winter (Cramp 1980). A study indicated that White-tailed Eagles prefer fish if available and use waterfowl as a secondary food source (Nadjafzadeh et al. 2015). Fish constitute a significant proportion of the diet of White-tailed Eagles during the breeding season across Europe, including in Lithuania where they comprise 63% of diet (Dementavičius et al. 2020), Romania – 45% (Sándor et al. 2015); Belarus – 53% (Ivanovski 2012); Swedish Lapland and the Baltic coast – 53% and 60%, respectively (Helander 1983); and Germany – 73% (Struwe-Juhl 2003). Fish are caught to a depth of 0.5 metres and hunting is usually, but not always, confined to shallow waters in both marine and freshwater habitats (Ekblad et al. 2016). Recent evidence from the Isle of Wight shows that fish are caught in shallow estuarine water at locations such as Newtown Harbour, where Grey Mullet are the favoured species, and also in the sea off the south coast of the Island, with birds foraging up to 4.3 km from the coast throughout the autumn and early winter (Figure 7).

Piracy of food from Otters *Lutra lutra*, large gulls and Cormorants *Phalacrocorax carbo* is often practiced, and individuals become skilled at chasing birds to make them disgorge fish or to steal fish (Källander 2018). In southern Sweden, White-tailed Eagles were observed using fishing flocks of Cormorants and also Goosander *Mergus merganser* as an aid to obtain fish on nearly 50% of c.100 visits to Lake Vombsjön during November to March (Källander 2018). They were frequently observed catching fish that had been displaced to the surface by the diving piscivores, while on some occasions the eagles would fly low over the flock and then

accelerate towards a Cormorant or Goosander with fish. Eagle attacks on birds with fish often occurred when a bird tried to evade kleptoparasitic attacks by either conspecifics or gulls. Usually, the attacked bird would drop the fish and dive quickly, enabling the eagle to pick up the fish. Having secured it, the eagle would immediately head for trees on the shore. Adults appeared to have higher success rate than younger eagles when kleptoparasitising cormorants and mergansers. Some 16 successful attempts were recorded for adults versus circa seven for juveniles, despite the fact juveniles were seen above fishing flocks three times more than adults (Källander 2018).

White-tailed Eagles can also become skilled at picking up discards from fishing boats after watching large gulls, as well as taking waste scraps of fish from crab and lobster fishermen when they are rebaiting their pots. In some Scottish waters, creel fishermen throw fish to White-tailed Eagles and this has been taken up by tourist boats, which attract White-tailed Eagles so that people can view and photograph the eagles at close range (D Sexton pers. comm. 2020).

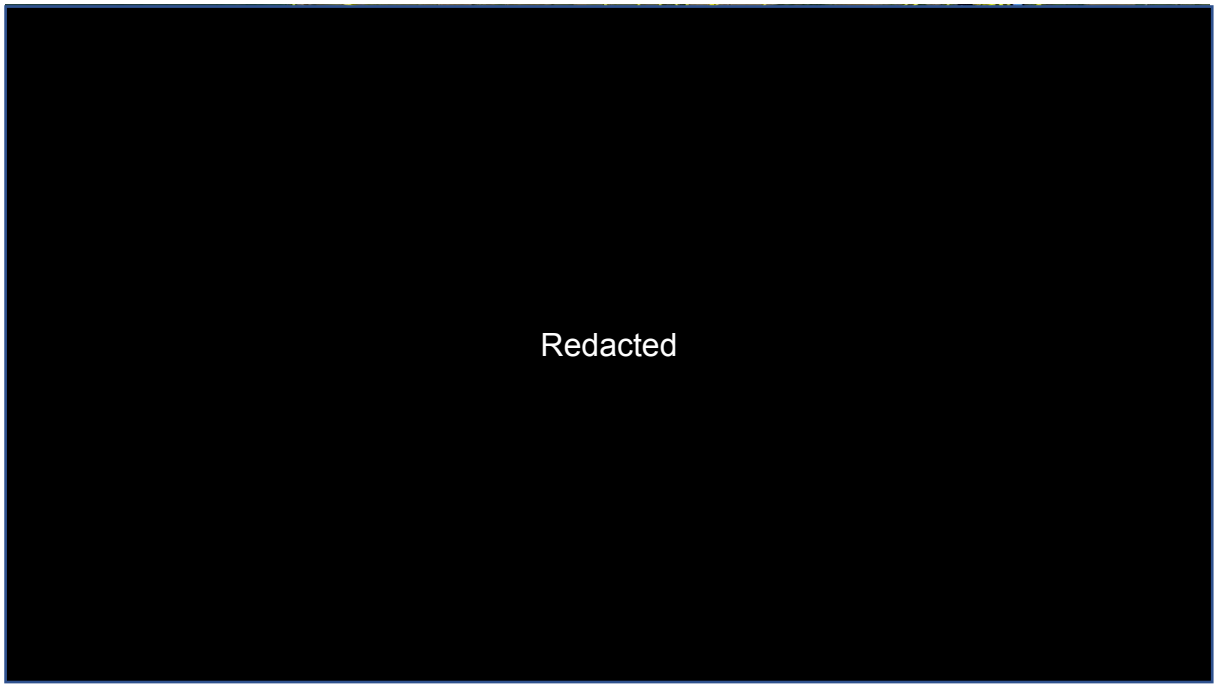
Historical records from Britain suggest White-tailed Eagles mainly took birds and fish in the summer and mammalian food during the winter (Love 1983). Marquiss et al. (2004) studied the diet of 15 Scottish pairs between 1998-2002, removing prey remains and pellets from nest. They found 15 species of mammal, 51 bird species and 23 fish species. They also found Common Toad *Bufo bufo*, squid, curled octopus and prawn nephrops. Fulmar *Fulmarus glacialis* was the predominant food species of seven pairs, and Rabbit or Mountain Hare *Lepus timidus* the main food of two pairs. More recently Whitfield at al. (2012) found that seabirds constituted a mean 49.6% of the diet of White-tailed Eagles at 16 nests in western Scotland. They found that fish comprised just 6.1% of the diet but acknowledged that fish were probably underestimated by prey remains collections. Sheep made up 19.2% of diet, but evidence from earlier studies indicates that the majority of lambs are likely to have been scavenged carcases (Marquiss et al 2004). In Ireland there have been no records of lamb killing (Mee 2017). There is also no evidence of any lambs being taken in the Netherlands, where sheep are frequently kept on the dykes to maintain short vegetation (van Rijn and Dekker 2016).

In the expanding population in the Netherlands – the closest geographically to Norfolk – the White-tailed Eagle diet during the breeding season consists predominantly of waterbirds (58%) and fish (28%) (van Rijn and Dekker 2016). Greylag Goose constitutes 38% of the waterbirds taken with Coot (34%) the next most frequently caught species. The eagles predominantly target Greylag Goose goslings, although sick or injured adult birds are also taken. The remaining species including dabbling ducks (15%) and smaller numbers of Great-crested Grebes *Podiceps cristatus*, Barnacle Geese *Branta leucopsis*, Egyptian Geese *Alopochen aegyptiaca* and diving ducks. Of fish species, carp and bream are most commonly caught (83%) with a range of others also taken, including Pike *Esox lucius*, Zander *Sander lucioperca* and Perch *Perca fluviatilis*. Carp and bream (generally ranging from 35-70 cm) are usually only taken when they are spawning and therefore close to the surface. Mammals only constitute a very small proportion of the diet (5%), but include Brown Rat *Rattus norvegicus*, Brown Hare *Lepus europaeus*, Mole *Talpa europaea*, Muskrat *Ondatra zibethicus* and mice spp.

As discussed in section 1.4 apex predators such as White-tailed Eagles have been shown to predate abundant mesopredators, such as the Commmon Buzzard. Nestlings of this species have been observed as prey items in the nests of White-tailed Eagles breeding in Germany (Neumann and Schwarz 2017) and more recently in Lithuania (Kamarauskaitė et al 2020). It was notable that Common Buzzards were most frequently recorded as prey items in inland areas of Lithuania where Buzzards are most abundant and alternative prey availability is reduced compared to coastal areas. This corroborates the notion that White-tailed Eagles adjust their diet according to local prey availability (Ekblad et al 2016).

The diet of White-tailed Eagles from the Isle of Wight has been studied in detail since the first birds were released in 2019. A combination of pellet analysis, prey remains and field observations has provided useful information. Four of the six birds that were released in August 2019 have survived into their second year and these birds, in particular, provide a valuable insight into the likely behaviour of birds released in Norfolk.

Fish has constituted a key part of the diet of two Isle of Wight birds in particular. Male G274 has been present on the Isle of Wight almost exclusively since release and satellite tracking data has shown that this bird has built up an extensive knowledge of the most suitable fishing locations around the coast. G274 and another bird – G324 – are frequent visitors to three key estuarine sites around the Isle of Wight, in particular Newtown Harbour where they readily catch Grey Mullet. The two birds have also been observed catching Black Bream *Acanthopagrus butcheri* in the Solent and European Bass off the coast at Blackgang. It is notable that they continued to catch marine fish into December. Satellite tracking and field monitoring revealed that during a 38-day period between [redacted] G274 spent 25 days (66%) in coastal locations, including 15 days (39%) around the estuary at Newtown NNR and 12 (32%) on the south coast at Blackgang where the bird fished in the sea, up to a maximum distance of 4.38 km from the coast (Figure 7). The bird was observed catching European Bass in this locality on a number of occasions during this period. It was joined by a second bird, G324, on a number of occasions and both birds were observed eating small fish in flight (Figure 8), including by local fishermen in boats off the coast (P Campbell pers. comm. 2020).



[redacted]

Figure 8. G324 eating a small European Bass caught off the coast of the Isle of Wight at Blackgang (photo by Andy Butler).

G274 also learnt to exploit seasonally abundant Common Cuttlefish *Sepia officinalis* populations that occur in seagrass beds in the Solent. These marine molluscs are locally common off the coast of southern England, typically spending the winter in deep water before moving into shallow coastal waters to breed in the spring and summer, where they are at risk of predation by White-tailed Eagles (Marine Biological Association 2020). The bird was observed catching them on several occasions during June and July (A Bennett pers. comm. 2020) (Figure 9).

Figure 9. G274 holding a Common Cuttlefish, just caught in the Solent (photo by Ainsley Bennett).

The satellite data has shown that the birds from the Isle of Wight have wandered widely during their first eighteen months. This was particularly evident from spring 2020 onwards and corroborates previous and ongoing research into the exploratory behaviour of White-tailed Eagles in their first two years in particular. The birds have visited coastal and inland locations during this period, but it is notable that when they have lingered inland, they have usually favoured areas of high lagomorph abundance. Analysis of pellets has shown that Rabbits have formed a key part of the diet of all four birds since release (Figure 11). G393 and G318 summered in the North York Moors [redacted]. G318 subsequently moved south to the Lincolnshire Wolds and again favoured areas where lagomorphs were numerous. The bird was observed catching Brown Hares on a number of occasions [redacted]. Similarly, G324 spent two months in the Lammermuir Hills in southern Scotland, favouring areas around Rabbit warrens on the lower slopes. Likewise, G274 was a frequent visitor to [redacted] in the

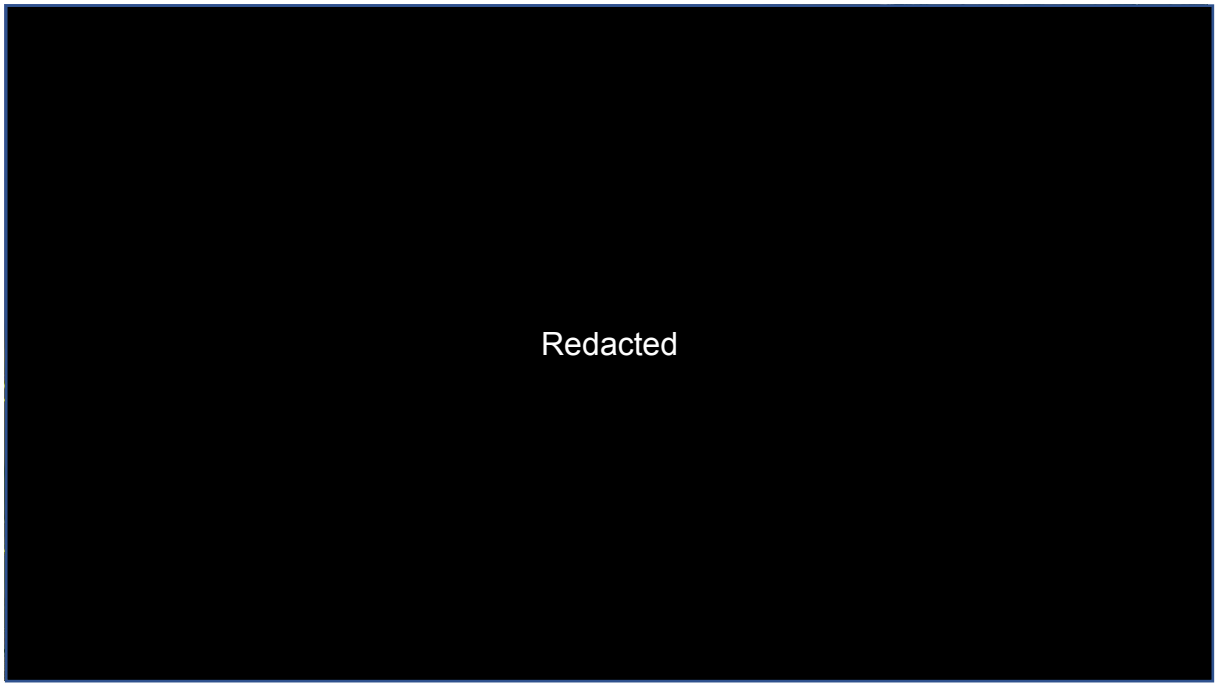
eastern part of the Isle of Wight during spring and summer 2020 where field observations indicated it was feeding exclusively on Rabbits.

Figure 10. G318 has favoured areas with high Rabbit and Brown Hare abundance since release on the Isle of Wight in August 2019 (photo by Bob Howe).

Figure 11. Pellets collected at a favoured roost site of G393 in March 2020 contained numerous amount of Rabbit fur. Rabbits have been a key prey item of all the birds since release.

Birds have also featured in the diet of all four birds since release. G393 was present in West Norfolk between 1st August 2020 and 4th January 2021 and during this period favoured two key areas – [redacted]. During its time [redacted], which is situated in a mixed arable and pig farming area with numerous scattered woods, G393 predominantly fed on Black-headed Gulls that were roosting and washing at a water storage reservoir on the estate. Rabbit and Brown Hare remains were also found in pellets under favoured roost sites.

The other favoured area was situated [redacted], particularly during November and December 2020. During this period the bird predominantly roosted in woodland [redacted], and then frequently flew out onto the mudflats in search of food, including dead Common Seals and other carrion. During a 40-day period during November and December 2020, satellite data showed that it flew out onto the mudflats on 21 days (52.5%) and frequented an area of woodland and scattered trees near its favoured roost site on the other days (Figure 12). G393 spent its first winter on the Oxfordshire/Buckinghamshire border where it favoured flooded fields in the valley of the River Thame that attracted significant numbers of wintering wildfowl and gulls. Pellet and prey remains included Mallard, Black-headed Gull, Wood Pigeon *Columba palumbus,* Corvid *Corvidae spp.* and Pheasant *Phasianus colchicus* as well as Rabbit (Figure 11). G274 and G324 have been observed feeding on dead gulls at Newtown Harbour and G274 was observed attempting to catch a Cormorant at the same location *Phalacrocorax carbo* (A Bennett pers. comm. 2020).



During their first winter when carrion is a particularly important element of the diet, all four birds visited game shooting areas where they fed on both Pheasant and Red-legged Partridge *Alectoris rufa* carcasses. Analysis of pellets recovered in these areas showed Rabbits were also taken. G393 was observed feeding on a deer carcass in Buckinghamshire for a number of days (M Wallen pers. comm. 2020) and G384 was observed feeding on a washed-up porpoise on the Isle of Wight coast in September 2019. Other birds were observed feeding on carrion in the strand line along the Isle of Wight coast, particularly during their first winter.

Overall, the diet of the released birds has been in keeping with predictions made in the feasibility report (Dennis et al. 2019) which suggested fish would likely constitute the key element of the diet in spring and summer, with waterbirds and carrion important during the winter. However, the high availability of Rabbits in many areas has provided a valuable additional food source, and the fact that one of the birds was observed catching Cuttlefish on a number of occasions exemplifies the adaptability of the species to exploit local abundance of different prey items (as per Ekblad et al

2016). It has also been very encouraging that the birds have continued to catch marine fish during the winter. Key prey items are summarised in Table 2 below.

Table 2. Key prey items of Isle of Wight White-tailed Eagles since release

Prey item	When taken	Comments
Marine fish, particularly Grey Mullet, European Bass and Black Bream	Year-round	Grey Mullet frequently caught in estuaries around coast of Isle of Wight Black Bream and European Bass caught in the Solent and elsewhere around IoW coast
Common Cuttlefish	Summer	Caught by G274 in seagrass beds in the Solent during June/July 2020
Lagomorphs –Rabbit and Brown Hare	Year-round	Movements of 2019 birds strongly influenced by lagomorph abundance, with birds only favouring inland areas away from water where Rabbits and Brown Hares present in good numbers
Black-headed Gulls	Year-round	Key prey item throughout year with adult and fledged juveniles taken, but no evidence of birds predating colonies of breeding gulls (which are also avoided in Netherlands/Denmark)
Dabbling ducks, particularly Mallard	Year-round, particularly winter	G393 wintered along River Thame on Oxon/Bucks border where large numbers of Mallard and also Wigeon present. Mallard feathers/remains found at regular roost site
Scavenged gamebirds – Pheasant and Red-legged Partridge	Winter	High prevalence of shot/injured gamebirds provided abundant carrion for first-winter birds
Corvids	Year-round	Corvid feathers/remains frequently located at regular roost sites
Wood Pigeon	Year-round	Wood pigeon feathers/remains frequently located at regular roost sites. May have been caught live or picked-up dead
Carrion scavenged along strand line	Winter	Birds observed feeding on dead fish and marine mammals washed-up along strand line around coast of IoW

2.3. Food availability

The release site has been selected due to its proximity to rich foraging areas in the Wash and the nearby North Norfolk coast which will provide a diverse array of potential food throughout the year. The fact that one of the Isle of Wight birds was present in the immediate vicinity of the proposed release for over five months from 1st August 2020 demonstrates its suitability for White-tailed Eagles.

It is likely that given evidence from elsewhere in their wider European range and recent experiences from the Isle of Wight project, that a population of White-tailed Eagles in eastern England, centred on West Norfolk, will feed on a range of prey items, including fish, waterbirds, lagomorphs and carrion, with the relative proportions of each varying according to season. Fish are most likely to be taken in spring, summer and early autumn, while waterbirds and carrion will be particularly important during autumn and winter. Lagomorphs are likely to be taken throughout the year in areas where they are common and it is likely the goslings of feral and resident geese will be important. A review of potential prey items has been undertaken by analysing the results of ongoing monitoring by different organisations.

2.3.1. Carrion

As a generalist forager, carrion often constitutes a key part of the White-tailed Eagle diet (van Rijn 2010, Nadjafzadeh et al. 2015) and we expect that carrion will be opportunistically taken throughout the year. Over half a million wildfowl and waders congregate in the Wash and North Norfolk coast alone during peak periods (Frost et al. 2020). These huge concentrations mean that foraging eagles will regularly encounter bird carcasses, and this will be particularly important for juvenile birds in their first winter, when they are less proficient hunters than older more experienced birds (Nadjafzadeh et al 2015).

White-tailed Eagles are also likely to feed on any washed-up marine mammals as they search shorelines for food. Grey Seals *Halichoerus grypus* are present around the Norfolk coast throughout the year, and begin pupping in late October/early November. They pup in large colonies, with females giving birth to a single pup that suckles for 15–21 days and then undergoes a post-weaning fast (PWF) before leaving the colony (Russell et al. 2019). Mortality of Grey Seals has been shown to

be very high in their first year with estimated annual survival as low as 19% for males and 62% for females, with condition at weaning a key factor for males in particular (Hall et al 2008). The largest pupping site in England is located at Blakeney Point on the North Norfolk coast where 3,399 pups were born over the winter of 2018/19 (National Trust 2020). A further 2,316 pups were born at Horsey Beach on the east Norfolk coast in 2018/19 (National Trust 2020).

The Common (or Harbour) Seal is widespread around the shores of the UK. They feed at sea but haul out on to inter-tidal sandbanks to rest, or to give birth and suckle their pups. As such, the extensive intertidal flats of the Wash and other locations along the North Norfolk coast provide ideal conditions for breeding and also hauling-out. Females give birth to a single pup in June or July each year. Pups are very well developed at birth and can swim and dive within a few hours. This enables Common Seals to breed in estuaries where sand-banks are exposed for only part of the day. The Wash supports the largest colony of Common Seals in the UK, with an excess of 3,000 individuals counted during annual moult counts (Thompson et al. 2019), which accounts for some 7% of the total UK population (JNCC 2020).

These large seal populations, coupled with the high mortality rate of young seals, means that seal carcasses are likely to provide a useful food resource for the White-tailed Eagles around the Wash and along the Norfolk coast. White-tailed Eagles are also known to scavenge seal after-birth in western Scotland (D Sexton pers. comm. 2020), and as such this could also provide additional food in both summer and winter, given the differing pupping times for the two seal species. This may be particularly important for juvenile birds in their first winter, when carrion is known to be particularly important (Nadjafzadeh et al. 2015).

It is also likely that eagles will occasionally encounter washed-up cetaceans, and perhaps learn to take waste scraps from fishing boats, as observed in Scotland and more recently on the Isle of Wight. In time tourist boats may also throw fish to White-tailed Eagles as undertaken in places such as the Isle of Mull and the Isle of Skye (e.g. http://www.mullcharters.com/popular.html).

White-tailed Eagles readily feed on mammal carcasses. In Germany Wild Boar *Sus scrofa* carcasses – usually related to animals hunted as game – constitute 29.5% of White-tailed Eagle diet during winter (Nadjafzadeh et al. 2015). Although Wild Boar are not present in eastern England, juveniles from the Isle of Wight have been observed feeding on Fox *Vulpes vulpes*, and deer carcasses in several areas. Similarly, a wintering juvenile White-tailed Eagle that was present in the New Forest and western Hampshire during the winter of 2018/19 was observed feeding on a deer carcass provided by a Forestry Commission keeper. Juveniles released at Ken Hill are likely to behave in a similar way. Indeed the high abundance of various deer species in eastern England mean that animals injured in road accidents sometimes die in open farmland, and thus will provide another potential source of carrion. Nadjafzadeh et al. (2015) suggest that juveniles search more intensively for mammal carcasses during their wide-ranging flights, than adults which are more proficient at catching live prey.

2.3.2. Fish

Evidence from around Europe and from the Isle of Wight shows that fish is often the primary food source for White-tailed Eagles, especially during spring and summer (Cramp 1980; Nadjafzadeh et al. 2015). Marine fish are thus likely to be a key prey item of White-tailed Eagles in eastern England, particularly given the coastal nature of the proposed release site.

The eastern England coast supports seasonally abundant fish populations. Of particular note are three species of Grey Mullet: Golden Grey Mullet, Thick-lipped Grey Mullet and Thin-lipped Grey Mullet. These species tend to congregate in large shoals in shallow water in estuarine and coastal habitat (Thomson 1986), and as such are easier to catch for White-tailed Eagles. They have proved to be an important prey item for White-tailed Eagles on the Isle of Wight, where they are frequently caught in estuaries. There is little information available on Grey Mullet abundance in UK waters as there is a lack of data collection on the species, but Environment Agency fish surveys have shown that both Thick-lipped Grey Mullet and Thin-lipped Grey Mullet occur in the estuary of the Great Ouse in the south of the Wash from spring through to autumn, and that the three species occur in sheltered

inlets and bays along the North Norfolk coast as well as in other estuaries in the wider East Anglian region (Environment Agency 2020).

European Bass is another potential prey species of White-tailed Eagles. Adult European Bass tend to spend time offshore but juveniles (up to 4-5 years old) often reside in shallow coastal lagoons and estuaries (Jennings and Pawson 1992). Environment Agency surveying has shown that European Bass are widely distributed along the Norfolk and eastern England coast (Environment Agency 2020), and as such, are likely to be a favoured prey species throughout the year, as observed on the Isle of Wight, where European Bass have continued to be caught into December 2020 (Figure 8).

It is also likely that White-tailed Eagles will parasitise fish from large gulls, Cormorants, and Otters, all of which are widely distributed throughout eastern England (Sainsbury et al. 2018, Frist et al. 2020). Kleptoparasitism is well documented in the genus *Haliaeetus* and White-tailed Eagles are known to steal fish from Otters in Western Scotland (D Sexton pers. comm. 2020) and flocks of fishing Cormorants and Goosanders in southern Sweden (Källander 2018).

In some European countries, such as Germany, many White-tailed Eagles breed in inland areas where they take an array of freshwater fish. Northern Pike accounts for up to 53% of White-tailed Eagle diet in Germany during summer months and 39% in winter, while the corresponding figures for Common Roach *Rutilus rutilus* are 44% in summer and 38% in winter (Nadjafzadeh et al. 2015). Similarly, in Lapland in northern Finland, fish accounted for 64.2% of prey brought to White-tailed Eagle nests in inland areas with Pike accounting for 49.8% alone. In the Netherlands Carp are the most commonly caught fish species (van Rijn and Dekker 2016). It is very likely, therefore, that in time a newly established Norfolk population of White-tailed Eagles will spread to the Norfolk and Suffolk Broads, which encompass 303 km² of freshwater lakes, marshes and rivers to the east and south-east of Norwich. Surveying by the Environment Agency has shown that species such as Pike, Roach, Bream and Carp are widespread and numerous in the Broads and are thus likely to become key prey items for White-tailed Eagles in future years (Environment Agency 2020b).

2.3.3. Waterbirds and other avian species

In the Netherlands waterbirds are the principal prey item of both breeding and wintering White-tailed Eagles (van Rijn and Dekker 2016), and it is expected that they will be similarly important in eastern England. Birds are usually captured on the water and on the ground, but rarely on the wing (Nadjafzadeh et al. 2015). Waterbirds are likely to be particularly important in winter when fish are more difficult to catch. Ken Hill's proximity to The Wash and several other areas which support vast numbers of wintering wildfowl mean that potential prey availability is high.

The Wash attracts huge numbers of non-breeding waterbirds during winter, with a five-year mean peak count of 381,498 individuals (Frost et al. 2020). Notable wintering wildfowl species include Dark-bellied Brent Goose (current five-year peak count mean = 13,545), Pink-footed Goose (34,211), Wigeon (12,172), Teal (2,905) and Shelduck (2,250). As such the area has the potential to provide rich foraging grounds for White-tailed Eagles. It should be noted that in many cases the eagles will take sick, injured, dying or dead birds and this is particularly the case with some of the larger species, such as geese. In Denmark, where there are now over 100 pairs of breeding White-tailed Eagles (from none in the early 1990s), it is thought that most geese and ducks taken by eagles are likely injured or sick (A. Fox pers. comm. 2019). White-tailed Eagles have been observed caching adult Greylag Geese in the Isle of Mull in Scotland (D Sexton pers. comm. 2020)

The nearby North Norfolk coastline also supports very large populations of wintering wildfowl. This is a key wintering area for Pink-footed Geese, with a mean peak count of 44,505 (Frost et al. 2020). Large numbers of Wigeon (five-year peak count mean = 11,120), Dark-bellied Brent Goose (7,273) and Teal (6,280) are also recorded each winter along the coast between Holme next the Sea and Salthouse.

Elsewhere in the region, the Ouse Washes, lies on the Norfolk-Cambridgeshire border, just under 50 km south-west of the Ken Hill. It forms the largest area of washland in the UK and attracts large numbers of wintering wildfowl, including Wigeon (five-year peak count mean = 23, 268), Whooper Swan (8,063), Teal (7,972), Mallard (2,939) and Coot (2,718) (Frost et al 2020). Meanwhile Berney Marshes and Breydon Water, an extensive area of intertidal mud and saltmarsh (375

hectares) and wet grassland (550 hectares), in the south-east of the Norfolk and Suffolk Broads, supports up to 100,000 wintering wildfowl and waders, including large numbers of Wigeon (five-year peak count mean = 28,723), Pink-footed Goose (16,518) and Teal (3,345) (Frost et al. 2020).

Evidence from the Netherlands and Denmark indicates that both Brent Geese and Pink-footed Geese are likely to be taken, although, as noted above, eagles are most likely to target naïve juveniles or sick, injured, dying or dead birds. Both Wigeon and Teal are species that are regularly predated in other parts of the species' range, including in the Netherlands and the large wintering populations of both species in West Norfolk and the wider region mean they are likely to provide a valuable winter food source (van Rijn and Dekker 2016). The sheer number of birds present during winter means that eagles will regularly encounter bird carcasses, as well as predating wildfowl.

During the breeding season, evidence from Europe (e.g. Sandor et al 2015; van Rijn and Dekker 2016) indicates that resident waterfowl such as Coot and Mallard are likely to be key prey items, along with both Greylag and Canada Goose goslings which are common and widespread in the region. East Anglia is a stronghold for the UK's large resident Greylag Goose population which was re-established through coordinated releases, predominantly by those with wildfowling interests, from the 1930s onwards (Mitchell et al. 2012). The Canada Goose, meanwhile, is a non-native species that is known to cause damage by overgrazing (Manchester and Bullock 2000). The current five-year mean peak count for Greylag Goose along the North Norfolk coast (2,559 in August) is the highest anywhere in England, with large numbers also recorded at the Wash (mean five-year peak count = 1,178 in September) (Frost et al 2020). It is particularly significant that these peak counts occur at the end of the breeding season. The mean five-year peak counts of Canada Geese, meanwhile were 570 at the Wash in August and 322 for the North Norfolk coast in October (Frost et al. 2020). Both species are also widespread breeders in the Norfolk and Suffolk Broads. For example, the five-year mean peak count of Greylag Geese at Ranworth and Cockshoot Broads alone is 582 and occurs in June, with significant numbers occurring at a number of other sites in the area (Frost et al. 2020). Greylag Goose goslings have been shown to be a key prey item among the

expanding population of White-tailed Eagles in the Netherlands (van Rijn and Dekker 2016) and they are also capable of catching adult birds, particularly if they are sick or injured (D Sexton *pers. comm.* 2020). It is very likely therefore, that both geese species will provide a key prey item for White-tailed Eagles in eastern England during the summer months.

Waders are only occasionally taken by White-tailed Eagles, and evidence from other European populations indicates that they are more likely to favour waterfowl (Ekblad et al. 2016; van Rijn and Dekker 2016). Knot are the most numerous wader species in the Wash, with birds congregating in vast high-tide roosts at gravel pits at Snettisham RSPB (current five-year mean = 177,869). Other notable species include Dunlin (27,258), Oystercatcher (20,471) and Bar-tailed Godwit (18,579). Similarly high numbers of waders also occur along the North Norfolk coast, with Knot (10,226) and Oystercatcher (5,713) again widespread. Wintering waders on the Ouse Washes include Lapwing (9,426), Golden Plover (5,675) and Black-tailed Godwit (2,972) (Frost et al. 2020).

Corvids and Wood Pigeons have been favoured prey items of White-tailed Eagles from the Isle of Wight (Table 2) and it is very likely that this will also be the case in eastern England; Corvids and Wood Pigeons are abundant throughout eastern England and are controlled in many areas. Black-headed Gulls have also become a key prey item of birds from the Isle of Wight (Table 2), [redacted]. Black-headed Gulls are widespread in the region and likely to be caught throughout the year, although White-tailed Eagles are known to avoid breeding colonies (D van Straalen pers. comm. 2019, A Fox pers. comm. 2019).

2.3.4. Mammals

Although White-tailed Eagles will readily predate mammals, evidence from other parts of their European range indicates that in areas of high alternative prey availability, such as the Wash, they usually constitute only a small proportion of the diet (Mlíkovský 2009; Sandor et al. 2015; Ekblad et al. 2016; van Rijn and Dekker 2016). However there has been a clear trend for birds released on the Isle of Wight to favour areas with high lagomorph populations. One bird, G318, in particular, has

predominantly favoured inland areas since release, and nearly always sites with locally abundant Rabbit and/or Brown Hare populations. It is notable that this bird has been present in Lincolnshire since late September 2020 and has favoured an area of the Lincolnshire Wolds, [redacted]. Here the bird has been observed catching and feeding on Brown Hares and Rabbits on a regular basis (D Satterthwaite pers. comm. 2020).

Rabbits declined nationally since the turn of the century as a result of two strains of Rabbit haemorrhagic disease virus (RHDV1 and RHDV2) (Bell 2019), but appears to have recovered in some regions and remains widespread and locally abundant in many areas, particularly in areas with light soils, such as the Brecks (Norfolk and Norwich Naturalists' Society 2017).

East Anglia is also known to be a national stronghold for Brown Hare with the species widespread in open landscapes, including arable areas throughout Norfolk and the wider region (Norfolk & Norwich Naturalists' Society 2017). For example, Lloyd Park, Conservation Lead and Ecologist at Ken Hill undertook at a single night survey of a 481 acre section of arable farmland on the estate in February 2021 using thermal imaging equipment and logged 454 Brown Hares and 102 Rabbits. Recent research shows that RHDV2 has spread to hares, and may be causing increased mortality (Bell 2019), but like Rabbits, the species remains widespread and locally abundant (Norfolk and Norwich Naturalists' Society 2017). It seems very likely, therefore, that given the diet preferences of juvenile White-tailed Eagles from the Isle of Wight, and the importance of Rabbits, in particular, as a significant prey item for predatory raptors in the UK and other areas, such as Iberia (Lees and Bell 2008), that the two lagomorph species will provide a key source of food for the released eagles in West Norfolk and the wider East Anglian region.

The eagles will also eat mammal carcases, such as Fox, left out in open areas as well as marine mammals and cetaceans washed up on tidelines, as previously discussed. White-tailed Eagles from the Isle of Wight have been observed eating fox carcasses on a number of occasions since release.

2.3.5. Conclusion

The broad diet of the White-tailed Eagle and the high abundance of various taxa in West Norfolk and the wider eastern region mean that prey availability will be high throughout the year. Considering evidence from across Europe and from the Isle of Wight reintroduction, the likely prey items and how they might vary through the year is outlined in Table 3 below.

Table 3. Likely key prey items in West Norfolk and wider eastern region for an establishing population of White-tailed Eagles

Prey item	Availability	Comments
Marine fish, particularly Grey Mullet and European Bass	Spring-late autumn	Widespread around the coast, and likely to be caught in shallow inlets and bays. Isle of Wight birds have continued to catch marine fish into winter – this may also be the case around the East Anglian coast
Freshwater fish, particularly Northern Pike, Common Bream, Common Roach and Common Carp	Year-round	Locally abundant in some wetlands, particularly in the Norfolk and Suffolk Broads. Favoured prey item in many parts of inland Europe.
Resident and feral geese – Greylag Goose, Canada Goose and Egyptian Goose	Year-round	Abundant and increasing. Goslings likely to be favoured in spring/summer, with sick or injured adult birds taken throughout year. Key prey item in the Netherlands.
Migratory Geese - Pink-footed Goose and Dark-bellied Brent Goose	Winter	Large wintering populations along Norfolk and Lincolnshire coast. Sick or injured birds likely to be taken throughout the winter. Sick or injured Brent Geese frequent prey item in Denmark.
Migratory dabbling ducks, particularly Wigeon, Teal and Gadwall *Mareca strepera*	Winter	Locally abundant. Key prey item in the Netherlands.
Resident dabbling ducks, particularly Mallard, plus Gadwall	Year-round	Locally abundant
Diving ducks particularly Tufted Duck *Aythya fuligula* and Pochard *Aythya ferina*, Coot and Great-creasted Grebe	Year-round, but particularly winter	Locally abundant, particularly in winter. Key prey item in the Netherlands.

Gulls, particularly Black-headed Gulls	Year-round	Black-headed Gulls locally abundant throughout the year. Adult/fledged juveniles key prey of White-tailed Eagle in west Norfolk during autumn/winter 2020, as well as other IoW birds elsewhere. Other gull species likely to be opportunistically taken.
Corvids	Year-round	Abundant. Adult and juvenile birds caught by IoW White-tailed Eagles since release
Scavenged game birds and wildfowl – Pheasant and Red-legged Partridge	Year-round, but especially winter	Shot/injured game birds have been opportunistically scavenged by IoW White-tailed Eagles, particularly during their first winter after release. Less important for older birds as their ability to capture live prey increases. Injured wildfowl may also be taken in areas where wildfowling occurs during winter. White-tailed eagles are not adapted to catch fast flying gamebirds diving into cover.
Scavenged waterbirds	Winter	Very large wintering populations around the coast will provide widespread carrion during winter in particular.
Lagomorphs – Rabbit and Brown Hare	Year-round	Rabbits and Brown Hare locally abundant throughout the region. Favoured prey item of IoW White-tailed Eagles since release.
Scavenged dead seals and other carrion along the strand line – Common Seal and Grey Seal	Year-round	Locally common along coast. Eagles may encounter dead seals throughout year, and especially around pupping times. IoW White-tailed Eagle known to have foraged on dead seals in the Wash. Marine fish will also be scavenged when washed up along the strand line.

2.4. Breeding

2.4.1. Nesting habitat

In Scotland, White-tailed Eagles build nests in trees and on cliffs, but evidence suggests that tree nests are preferred, and are usually sited in wooded areas close to water (median distance to water of tree nests = 0.2 km (n =19)) (Evans et al. 2010). Large trees are usually favoured without a specific tree species preference, with coniferous and deciduous used (Cramp, 1980). A recent study of nest-site selection at the Danube Delta demonstrated that White-tailed Eagles favoured large willows (*Salix* spp., 70.8%), and native white poplar (*Populus alba*, 20.8%), with 50% of nests built at a height of 16-19 metres (Sandor et al. 2015).

In Poland, which holds approximately 20% of the European population of White-tailed Eagles, breeding birds typically build nests in forests, and hunt in open areas, predominantly in freshwater lakes. The size of the territory depends on food resources, but on average covers an area of approximately 60 km² (range = 19-115 km²) (Struwe-Juhl 2003). Although many breeding pairs occur in mature pine and beech forests with trees 90-120 years old, White-tailed Eagles are capable of breeding in all types of woodland as long as there are trees capable of supporting the large nest (Anderwald et al 2013). At least 15 tree species have been used and it is significant that as the Polish White-tailed Eagle population has expanded geographically, some pairs have started to build nests in small forest enclaves surrounded by meadows, or even on individual trees on floodplains or in trees along field margins (Lontkowski and Stawarczyk 2003).

The recent colonisation of the Netherlands, France and other parts of Western Europe by breeding White-tailed Eagles further emphasises the ability of the species to breed successfully in well-populated lowland areas, even in the absence of large expanses of woodland. A field visit to the Netherlands by Roy Dennis and Tim Mackrill in 2018 showed the ability of the White-tailed Eagle, when it is not persecuted, to live in a highly anthropogenic landscapes of farmland, villages, towns and even cities, as long as there is sufficient wild food and suitable nesting places in quieter areas. The distance of nest sites from busy activity in the Netherlands can be as little as 500 metres. Further details from the visit to the Netherlands can be found

in Appendix 2. Furthermore, a well-publicised pair of White-tailed Eagles recently settled in an urban setting in central Helsinki (video of nest site and surrounds - https://youtu.be/Htffno42AG4)

A notable feature of the White-tailed Eagles released on the Isle of Wight is that they have shown a clear preference for wooded landscapes, often near the coast. The birds can be remarkably unobtrusive in these areas and can often go for prolonged periods without being detected.

2.4.2. Nest site availability

Evidence from the Isle of Wight project and satellite tracking of juvenile White-tailed Eagles around Europe such as the Netherlands (https://portal.werkgroepzeearend.nl/) and Finland (https://www.luomus.fi/en/finnish-white-tailed-sea-eagles-satellite-tracking) demonstrates that young birds wander extensively in the first two-three years after fledging. However, research has shown that the species is highly philopatric, with young birds usually settling to breed close to their natal site. In Scotland, the median age of recruitment to the breeding population was 4 years for males and 5 years for females, and median values for natal dispersal were 21–45 km in males and 47–58 km in females (Whitfield et al 2009). This, however, varied according to the stage of the reintroduction project. Natal dispersal distances were identical among the males and females that bred following the first phase of releases; but as the population expanded, sex differences became more apparent with females dispersing further than males. This was exemplified by the fact that the mean terrestrial natal dispersal (i.e. straight-line distance between the release site and first breeding location minus any distance over sea) of breeding birds from the first Scottish release was 11 km for males and 11 km for females (full direct line distances (i.e. including areas of sea) 45 km / 47 km). The corresponding figures for wild-bred birds remained 11 km for males but rose to 26 km for females (full direct line distances 21km / 58 km). It is reasonable to predict, therefore, that in the early years of settlement White-tailed Eagles released in West Norfolk are likely to breed close to the release site at Ken Hill, up to distance of approximately 50 km.

The landscape in the likely settlement area is typical of eastern England, mostly comprising arable farming. The most recent Organisation for Economic Cooperation and Development (OECD) landcover statistics for 2018 show that 84.3% of the North and West Norfolk region is given over to arable farmland, with tree cover limited to 3.5%, while in Lincolnshire the corresponding figures are 92.4% arable and 1.3% tree cover (OECD 2021) (see also Figure 16). It is important to note, however, that evidence from the Netherlands demonstrates that White-tailed Eagles can breed successfully in landscapes lacking extensive areas of tree cover. For example, the tree cover in the region south of Rotterdam in the Netherlands that White-tailed Eagles have recently successfully colonised (including sites such as Krammer-Volkerak – se Appendix 2) is just 2.8%. (OECD 2021). Similarly, White-tailed Eagles are known to build nests in isolated trees in Poland, as described above (Lontkowski and Stawarczyk 2003). It is important to note, however, that there are more extensive areas of woodland cover in parts of West Norfolk, most notably from Ken Hill south to Kings Lynn.

In non-forested areas of Poland, White-tailed Eagles nest linearly along the coast, and a similar pattern of settlement is also evident along other linear landscape features, such as river valleys. For example, along a 50 km x 2-3 km section of the Warsaw-Berlin Pradolina, nests of individual pairs are located a mean 10.5 km apart (D. Anderwald unpub. data.). Research in Poland has shown that White-tailed Eagles usually hunt within the distance of 3-5 km from the nest, but will also fly 9-20 km to reach rich fishing grounds (Fischer 1984, Mrugasiewicz 1984, Anderwald and Przybyliński 2011). The preference of White-tailed Eagles to breed close to water, coupled with the rich foraging opportunities along the Norfolk coastline, suggests that early settlers will build nests in woodlands, copses or even isolated trees situated 3-10 kilometres from the coast, and it is reasonable to predict that breeding density will be similar to that recorded along linear landscape features in non-forested areas of Poland.

Analysis of satellite and aerial imagery of the West and Norfolk coastline shows that sufficient woodland cover exists to support up to 6 pairs along the Norfolk coastline in the likely natal dispersal area of translocated birds. Although coastal areas can become extremely busy with visitors during peak periods, woodlands situated 3-10

kilometres inland from the coast are much less frequently visited and many are located on private land. For example, the wooded area favoured by G393 from the Isle of Wight [redacted] was an area that may very well support breeding White-tailed Eagles in the future (Figure 14). There were only sporadic sightings of this bird by members of the public and it was never disturbed at its roost site, which was situated on private land with no public access.

Artificial nests have been used with some degree of success in various countries, including Scotland and Poland (Anderwald et al. 2013) and it would be helpful to erect artificial nests in suitable woodlands, copses and isolated trees with supportive landowners to facilitate settlement. Nests would be best sited in locations favoured as roost sites by translocated birds, and these will be identified by the project team as dispersal patterns emerge. The project team has extensive experience of building artificial nests for raptors, including White-tailed Eagles (Figure 13). In established populations young White-tailed Eagles often enter the breeding population when a vacancy becomes available due to the loss of a breeding bird at an established nest, but in new populations where there is no recent history of breeding, artificial nests are a useful means by which to facilitate establishment of secure nesting locations.

Figure 13. An artificial nest built by the Roy Dennis Wildlife Foundation team at the release site on the Isle of Wight

The Lincolnshire Fens also lies within the likely natal dispersal range of the translocated birds. Here, woodland cover is more sporadic than in West and North Norfolk, but breeding pairs could utilise small copses and isolated trees. Like in West Norfolk, nests in Lincolnshire are likely to be situated close to the Wash, up to a maximum of approximately 10 km inland. The landscape of the Lincolnshire Fens is very reminiscent of the areas which hold breeding White-tailed Eagles in the Netherlands. Here birds readily build nests in isolated groups of trees in a highly anthropogenic, intensively-managed landscape (Appendix 2). G318 from the Isle of Wight spent 18 days in the Lincolnshire Fens during November 2020. During this period the bird roosted in the same 14 hectare woodland (Figure 15). The project team spoke to the owner of the wood, who was delighted that the bird was present.

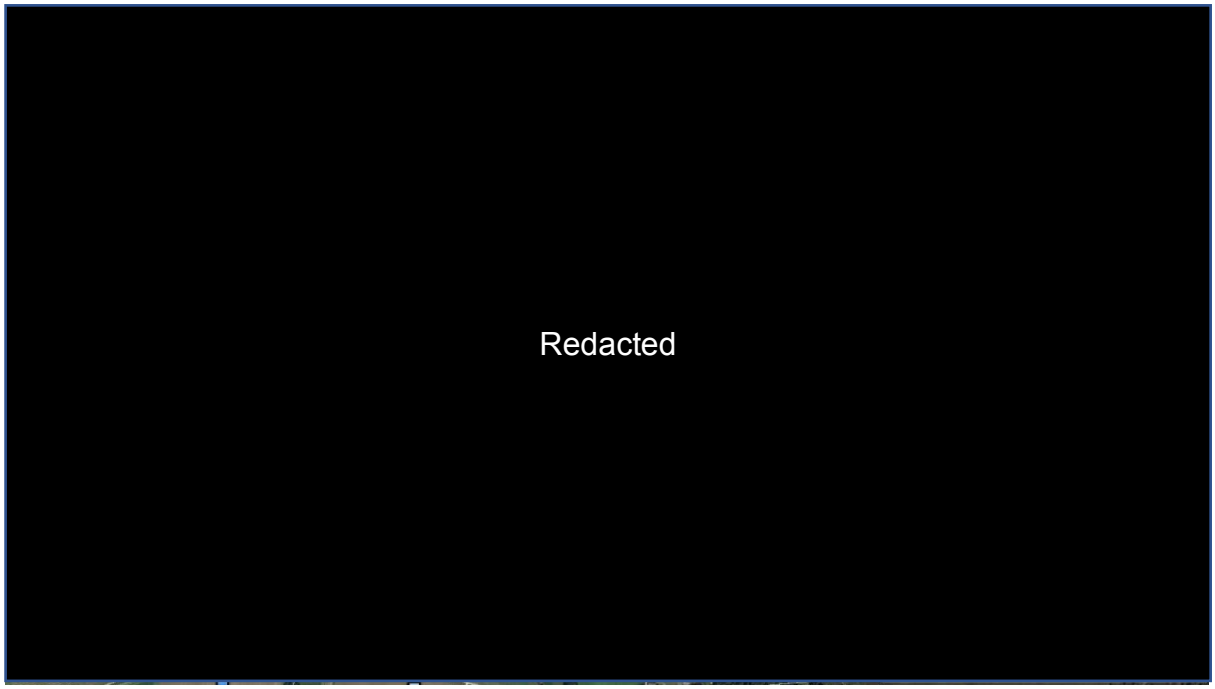


Figure 14. The core area favoured by G393 [redacted]. The bird roosted in an area of woodland [redacted] and foraged in the Wash. Wooded areas close to the coast [redacted] are likely to provide ideal breeding habitat for White-tailed Eagles in East Anglia.

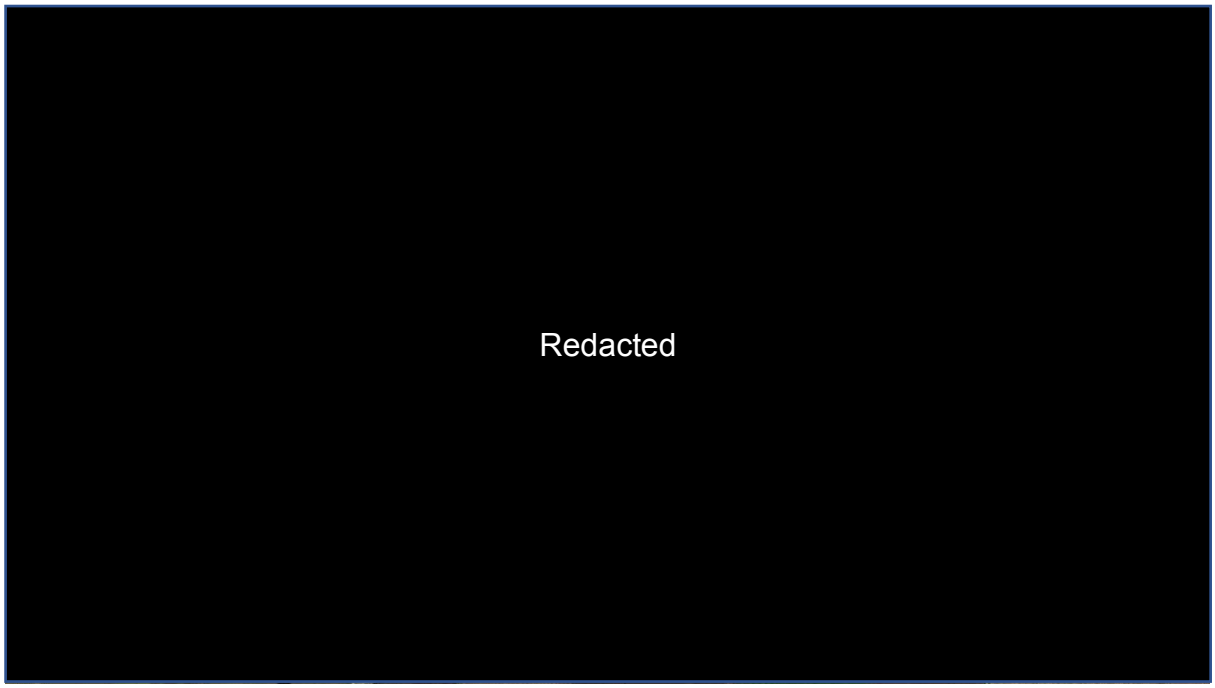


Figure 15. G318's roost site in a 14 hectare woodland in the Lincolnshire Fens. Small woods like this would be capable of supporting breeding White-tailed Eagles in the future.

Whilst it is expected that White-tailed Eagles will settle to breed close to the coast, it is possible that isolated pairs may build nests in inland areas away from larger expanses of water. Thetford Forest lies within the expected natal dispersal range, and there is the possibility of breeding eagles settling there, particularly in view of high local rabbit abundance. Similarly, the Lincolnshire Wolds has very high lagomorph density as well as significant areas of woodland cover, which might lead to isolated breeding pairs becoming established. Immature female G318 from the Isle of Wight spent the vast majority of winter 2020/21 in the Lincolnshire Wolds, as previously described.

Although isolated pairs may disperse further than 50 km, it is hoped that a core population of 6-10 pairs will become established in the expected natal dispersal area (i.e. within 50 km of Ken Hill) 10-20 years after the first release. Once this population is established, it will facilitate expansion into other parts of eastern England. Like in North and West Norfolk it is likely that most of the breeding pairs that become established in the region will be coastal, and the colonisation of the Norfolk and Suffolk Broads is also likely in the medium term.

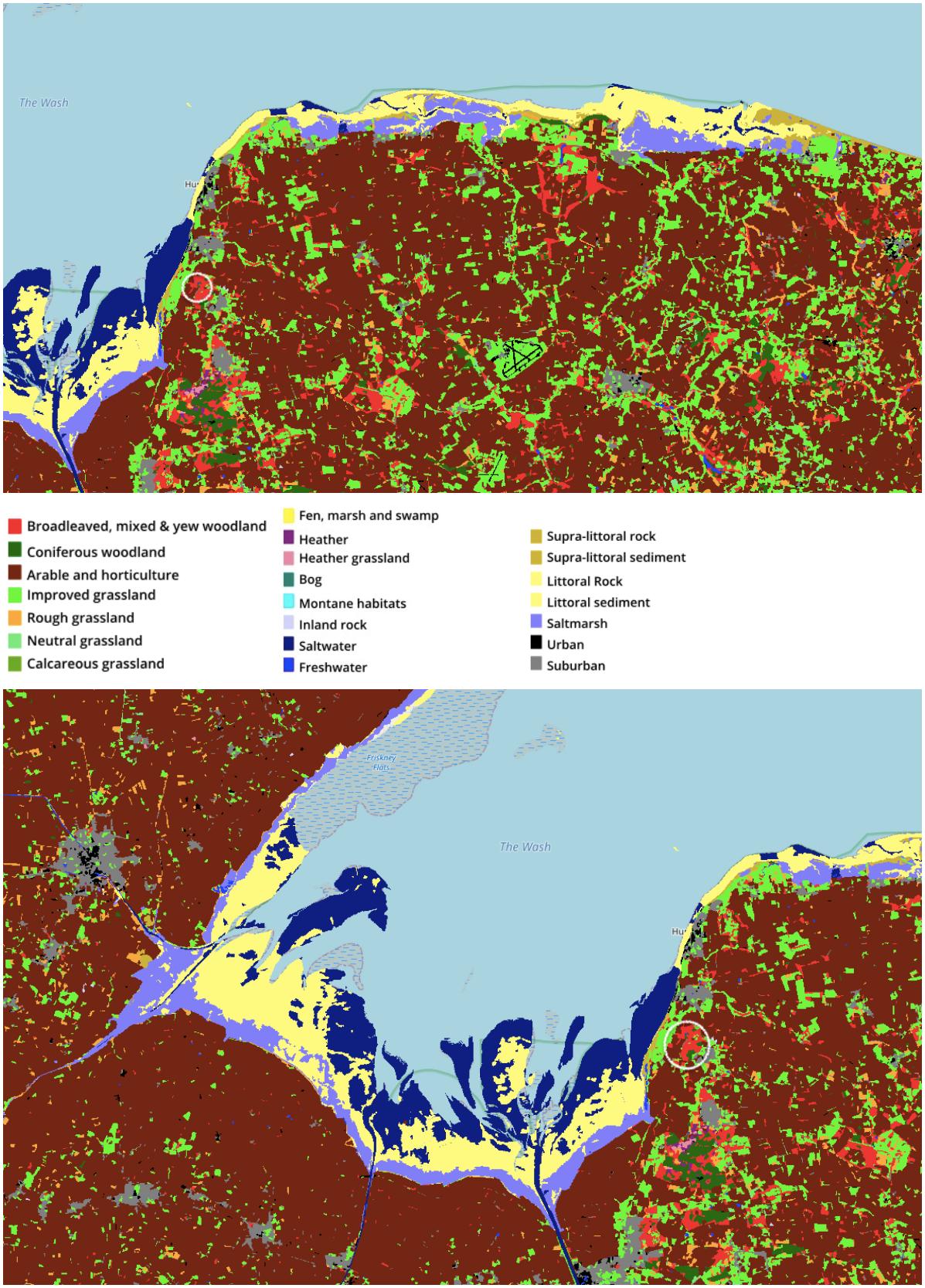


Figure 16. Maps showing landcover in coastal areas of the likely natal dispersal range of White-tailed Eagles in Norfolk and Lincolnshire. Ken Hill located by white circles. (Based upon LCM2007 © UKCEH 2011)

The estuaries of Suffolk and Essex with rich populations of Grey Mullet are particularly suitable breeding localities further south, and in the long term it is likely that breeding White-tailed Eagles will eventually reach the Thames estuary. Whilst we expect that population expansion is most likely to occur south along the East Anglian coast, the location of the release site will also facilitate the establishment of breeding pairs further north in Lincolnshire (i.e. north of the Wash) in the medium-long term. The Humber estuary, for example, would be capable of supporting breeding White-tailed Eagles. Like in East Anglia, woodlands and copses within 10 km of the Humber are the most likely breeding localities.

Once the West Norfolk population has become established a faster rate of population growth and geographical spread might be expected, as observed in Scotland, where breeding pairs are widely dispersed in western areas in particular. However, given that it has taken over 40 years for the Scottish population to reach its current level of 140 breeding pairs (the first releases were in 1975), this is unlikely to be a fast process even if, as expected, breeding productivity is greater in eastern England due to high natural prey availability and more favourable weather conditions. There are already indications that the Scottish population may have reached carrying capacity in some areas with increased instances of intra-specific aggression and killing of rival birds noted in recent years (D Sexton pers. comm. 2020). This may be an early sign of density dependent population regulation.

In an extremely well-studied population of White-tailed Eagles in the region of Schleswig-Holstein in northern Germany, the density of breeding eagles in optimum habitat is 1.4 pairs per 100 km² (Krüger et al. 2010), but lower in less favourable areas (0.3 pairs per 100 km²). Thus, the expected carrying capacity of Schleswig-Holstein as a whole (15,763 km²) is 122 pairs. Like in Scotland, Krüger et al. 2010 predict the current rate of population growth will slow over time as density dependent processes begin to act on the population. In Poland, the average territory size is approximately 60 km², but ranges from 19-115 km² (Anderwald et al 2013).

We expect the population in eastern England to be predominantly coastal with some additional pairs breeding further inland in parts of the Norfolk and Suffolk Broads and other freshwater wetlands in the region. This means that the population density and

overall carrying capacity will be lower than that observed in Germany and Poland where numerous large inland lakes support very high numbers of breeding pairs. The distribution of breeding pairs is more likely to be akin of that in coastal regions of Poland, with breeding pairs situated every 10-15 km. The East Anglian coastline covers some 260 km from the Wash to the Thames estuary and thus it might be reasonably expected that 25 pairs of White-tailed Eagles will eventually breed at intervals along the coast, with smaller numbers around some inland wetlands. It is also probable that some pairs will expand north through Lincolnshire, particularly in and around the Humber estuary. The eastern region, from the Humber to the Thames, may therefore support up to 40 pairs of White-tailed Eagles within 40-50 years.

In view of the timescales involved in the project, it is important to consider whether climate change could have an effect on the future biological suitability of the region. This is highly unlikely to be the case given that breeding White-tailed Eagles occupy a broad geographical range, and thus climatic conditions, from Turkey and Iran to Greenland and Arctic Russia (Birdlife International 2021). This demonstrates their ability to successfully exploit seasonally available food sources that vary with geography and climate.

2.4.3. Monitoring of breeding sites

All released birds will be closely monitored in the field and by satellite tracking. It will be particularly important to monitor any breeding activity and to liaise directly with all relevant stakeholders to ensure that any nests are not disturbed. This will be done on a case-by-case basis as the population develops. The project team has extensive experience of monitoring and protecting breeding raptors, and building relationships with landowners and other key local stakeholders in this way, and does not publicise locations in sensitive areas in order to protect the birds and prevent disturbance. This approach has been taken with the birds released on the Isle of Wight when they settle in a new area, and has been welcomed by landowners. Some concerns were raised during the public consultation that the project team would only be involved in this work during the five years of the release phase of the project. This is unequivocally not the case. The decades of work undertaken by members of the

project team including Roy Dennis, Tim Mackrill and [redacted] demonstrate an unerring commitment to the restoration of raptor populations and the vital importance of maintaining good relations with all stakeholders as breeding populations become established. The project team will encourage local licenced raptor workers to assist with monitoring of nests and liaison with landowners and other land managers as the breeding population expands geographically.

In Poland and other European countries buffer zones are established around raptor nests in some areas, such as state forests, to prevent disturbance to breeding pairs, although they are not required in areas of private land. The size of buffer zones vary from country to country but are typically in the range of 300-500 metres during the breeding season, with forestry work prohibited. Our experience is that the best approach in England is to assess nests on a case-by-case basis depending on local factors such as topography, vegetation cover, land-use and public access, to ensure that breeding eagles are not disturbed, but present land-use is unaffected as much as is reasonably possible. It should also be noted that in some parts of Europe White-tailed Eagles have become increasingly tolerant of human activity (Helander and Sjernberg 2002), and White-tailed Eagles also nest close to well-used footpaths on the Isle of Mull in Scotland (D Sexton pers. comm. 2018). This is likely to be the case in West Norfolk and the wider region as the population develops.

The establishment of public viewing sites will be an important means by which to manage eagle visitors and ensure that other outlying nests are no disturbed. Such an approach has been undertaken with great success with nesting White-tailed Eagles on the Island of Mull, which diverts attention from other nests on the island.

2.4.4. Conclusion

The ability of the White-tailed Eagle to breed successfully in highly anthropogenic landscapes across Europe is highly encouraging. The abundant food supplies in coastal areas of eastern England, coupled with potential nest sites in woodlands, copses and even on isolated trees mean that the aim of establishing a self-sustaining population is eminently achievable, with breeding success likely to be higher than in western Scotland due to a greater abundance of natural food and

more favourable weather conditions. It will be important to work closely with all key stakeholders when White-tailed Eagles become established in an area and the project team is fully committed to this long-term plan. The restoration of a long-lived bird with delayed sexual maturity is a slow process and it is likely to take 10-20 years for an initial self-sustaining population to become established.

3. The ecological impact of a White-tailed Eagle reintroduction

3.1. Potential ecological impact

The reintroduction of the White-tailed Eagle to West Norfolk and eastern England would restore a key apex predator to the area. In recent years the positive ecological impact of such species has become increasingly apparent through the principle of trophic cascades (Estes et al 2011), and also as key indicator species (Helander et al. 2008). The White-tailed Eagle is also regarded as an important flagship species for wetland conservation across Europe (Sandor et al 2015); thereby corroborating the notion that the conservation of charismatic top predators brings wider biodiversity conservation benefits (Sergio et al 2006).

As described in Section 2.2 the White-tailed Eagle is a generalist predator with a broad diet that varies spatiotemporally within the landscape (Dementavičius et al. 2020) and according to the most seasonally abundant prey (Ekbald et al 2016). There have been numerous studies on its diet in northern Europe (e.g. Cramp 1980; Sulkava et al 1997; Horváth 2003; Marquiss et al. 2004; van Rijn et al. 2010; Sandor et al. 2015; Ekbald et al. 2016). No quantifiable negative effects have been demonstrated; almost certainly because the species targets the most locally abundant food source and also readily takes sick and injured specimens as well as carrion.

There have been suggestions that predation by White-tailed Eagles may have contributed to population declines in Common Eider *Somateria mollissima* in parts of the Baltic Sea (Ekblad et al. 2020), but predation by non-native American Mink has been shown to be an increasing problem (Öst et al. 2018) and a propensity for female eiders to skip breeding could not be reliably attributed to the abundance of White-tailed Eagles (Öst et al 2018). Furthermore, as an apex predator White-tailed Eagles have the potential to suppress the abundance of mesopredators, such as American Mink. They are known to predate American Mink in the region and female mink modify their behaviour according to eagle predation risk (Salo et al. 2008). As such the recovering White-tailed Eagle population may have positive long-term cascading effects on lower trophic levels including bird, mammal and amphibian populations in the archipelago (Salo et al. 2008).

Dementavičius et al (2020) made a specific effort to assess the threat of White-tailed Eagles to species of conservation concern in Lithuania by analysing prey remains recovered from White-tailed Eagle nests between 1987 and 2018. Overall, the dataset comprised 2,373 prey items from 302 successful breeding attempts of 60 White-tailed Eagle pairs, which represents approximately one-third of the Lithuanian population. Fish were the most common prey, comprising 62% of sampled remains, followed by waterbirds (24%), terrestrial birds (10%) and mammals (4%). Northern Pike was the most abundant single species, constituting 19% of all identified prey and being detected in 47% of nests. It was followed by Common Bream (10%), while Eurasian Coot (7%) and Mallard (4%) were the most frequent bird species. Only a very small percentage of predated species were those of conservation concern, which corroborates the notion that White-tailed Eagles predate the most numerous and readily available species in the landscape. Seven of 57 bird species taken as prey are included in Annex I of the EU Birds Directive, but this amounted to just 21 individuals (i.e. 3% of overall avian total, and 1% of all available prey), of which 14 were either Common Crane *Grus grus* (7) or White Stork *Ciconia ciconia* (7) – both abundant and widespread species in Lithuania. Individuals of other protected species occurred only very occasionally. Similarly, only 19 individuals of five species listed as vulnerable in the IUCN European assessment were recovered from nests, 11 of which were Lapwing, while a single Bewick's Swan *Cygnus columbianus* was the only endangered species identified as prey. Dementavičius et al (2020) concluded therefore, that the recovered White-tailed Eagle population (125-150 pairs (Birdlife International 2015)) in Lithuania, does not limit populations of bird species of conservation concern, with most of these species described as 'marginal alternative prey', being locally scarce compared to the preferred fish and frequently taken, locally abundant waterbirds.

In some areas White-tailed Eagles are known to have a positive effect by exerting top-down control of species such as Greylag Geese, where populations would otherwise remain unchecked and continue to grow in the absence of a natural predator (van Rijn and Dekker 2016). Greylag and Canada Geese may have a detrimental effect on the wider ecosystem through interspecific competition for food

and nesting habitat with other less dominant species, and over-abundance also creates potential conflict with socio-economic interests (Tulloch et al 2017).

When considering any reintroduction, it is essential to consider all key local issues with regard to any potential impacts on the local ecosystem; and, specifically, to ensure that there will be no negative effects of the reintroduction. As part of the licensing process Natural England will undertake a Habitat Regulations Assessment on all the local SPA's and SAC's that may be affected either positively or negatively from the reintroduction. In this document, we consider the potential ecological impact of the reintroduction, particularly with regard to key conservation issues and designations in the region. We have paid particular attention to the area of expected natal dispersal of the translocated birds (i.e. within 50 km of the release site), as well as areas White-tailed Eagles are likely to spread to as a breeding population becomes more established.

3.2. Spoonbills and rare egrets

During the public consultation concerns were raised about potential White-tailed Eagle predation of nesting Spoonbills and rare egrets at Holkham NNR, which is situated 23 km north-east of the proposed release site at Ken Hill. Spoonbills breed within a mixed colony of Cormorants, Grey Herons and Little Egrets *Egretta garzetta* in a four-hectare wet woodland centred around a freshwater pool linked by wide dykes and surrounded by Oak *Quercus robur* and Poplar *Populus nigra*. Low growing willows *Salix spp.* make up the understorey and it is here that the Spoonbills breed (Bloomfield 2019). A total of 345 juveniles have fledged from nests in the colony since the first six pairs attempted to breed in 2010, and the population reached a record high in 2020 with 28 breeding pairs producing 56 fledged young. Other colonisation and breeding attempts are now being recorded at an increasing number of sites within the UK, but Holkham remains the key site for the species within the UK (Bloomfield 2019). In addition, Great White Egrets *Ardea alba* bred for the first time in 2016 and four pairs of Cattle Egrets *Bubulcus ibis* joined the colony in 2020 – the first documented breeding in Norfolk.

In view of the concerns that were raised, a concerted effort was made to determine potential impacts of White-tailed Eagles on breeding Spoonbills and rare egrets and

the project team liaised closely with Holkham NNR management team and advisory board.

Recent monitoring and research show that both Spoonbills and White-tailed Eagles are increasing in western Europe. It was estimated that there were 8,174-8,221 pairs of breeding Spoonbills in Western Europe in 2018, spread across at least 143 different colonies (Champagnon et al. 2019). The largest population occurs in the Netherlands where there are in excess of 3,000 pairs (Champagnon et al 2019). The population is widely dispersed across the country from the Wadden Sea in the north to the Delta in the south (Oudman et al 2017). White-tailed Eagles returned to the Netherlands in 2006 and the population has now risen to 20 breeding pairs (D van Straalen pers. comm. 2020). Many of the breeding White-tailed Eagle nests are closely monitored and there is no recent evidence of White-tailed Eagle predation. All of the White-tailed Eagle nests in the southwestern Delta are located within 1.5 km of breeding Spoonbills, which nest in colonies with Herring Gulls *Larus argentatus* and Lesser Black-backed Gulls *Larus fuscus*. There is no evidence of White-tailed Eagle predation despite the close proximity of nests, although, in this case, the gulls likely provide protection because eagles are known to avoid these colonies (D van Straalen pers comm 2020). Spoonbills breeding at Oostvaardersplassen are, likewise, not predated by local White-tailed Eagles either (S van Rijn pers. comm. 2020). The main predator of Spoonbills in the Netherlands is the Red Fox but overall predation is not considered an important factor. Instead, the abundance and accessibility of food in the areas surrounding the breeding colonies is likely to be the prime cause of colony size limitation (Oudman et al 2017).

White-tailed Eagles recolonised Denmark in 1995 and the population now numbers in excess of 100 breeding pairs (A Fox pers. comm. 2020). Spoonbills are also increasing with over 350 breeding pairs (Champagnon et al 2019) and the two species inevitably overlap in their breeding range with no apparent problems (A Fox pers. comm. 2020).

The population of Spoonbills in south eastern Europe has declined in recent years, including in Romania (Champagnon et al 2019), but there is no evidence that this is related to White-tailed Eagle predation. Marinov (2019) reported a total of 191-259

breeding pairs of Spoonbills at the Danube Delta between 2015 and 2018, as well as >2,000 pairs of Little Egrets, c.175 pairs of Great White Egret, and c.15 pairs of Cattle Egret. Sandor et al (2015), meanwhile, undertook a comprehensive diet analysis of the 20 pairs of White-tailed Eagles that breed around the delta, assessing prey remains at a total of 72 individual nests over three years. Birds continued 50% of the prey remains recovered from nests, compared to 44.6% fish, and 5.38% mammal. No Spoonbills or egrets were predated and instead the most commonly taken waterbird was Coot (9%) with 23 other species also recorded.

This evidence from different parts of Europe indicates it is highly unlikely that Spoonbills or egrets will be predated by White-tailed Eagles. The species coexist across much of Europe and even where the diet of White-tailed Eagles has been studied extensively in areas with high Spoonbill and egret abundance, such as Romania, there is no evidence of predation. The analysis of potential prey availability in Norfolk shows that there is an abundance of alternative food available throughout the year, and previous research on White-tailed Eagle diet shows that they tend to favour the most seasonally abundant prey (Ekblad et al 2016). During the breeding season it is very likely that the goslings of feral and resident geese will constitute a key element of the diet, as observed in the Netherlands (van Rijn and Dekker 2016) and foraging eagles are also likely to take fish along the coast, as observed on the Isle of Wight. Furthermore, the Spoonbill nests at Holkham are mostly located low down in willows in a patch of relatively dense woodland that would make predation almost impossible for a bird as large and bulky as a White-tailed Eagle. Cormorant nests located on higher trees may be more at risk of predation, but even that is considered unlikely given the abundance of alternative prey.

The situation will be closely monitored as part of the project's Monitoring and Evaluation Plan (Appendix 3) and a member of the Holkham NNR team will be invited to join the project's Steering Group.

3.3. Wintering bird assemblages

The release site at Ken Hill has been selected due to its proximity to rich foraging areas around the Wash and adjoining areas of the Norfolk and Lincolnshire coasts.

This area encompasses two key SPA sites – The Wash and North Norfolk Coast – that support very large assemblages of birds during the autumn and winter. In addition, the Ouse Washes SPA and Nene Washes SPA both lie within 50 km of the release site and, as such, fall within the area where released eagles might be expected to breed. The Norfolk Broads lies just outside this area, but it is very likely that this area will be colonised relatively soon after the first breeding pairs become established.

The Wash is one of the primary estuaries for wintering waterbirds in the UK, including internationally important numbers of 12 species – Pink-footed Goose, Dark-bellied Brent Goose, Knot, Dunlin, Oystercatcher, Bar-tailed Godwit, Black-tailed Godwit, Golden Plover, Grey Plover, Sanderling, Redshank and Ringed Plover (Frost et al. 2020), with a five-year mean peak count of 381,498 individuals (Frost et al 2020). The North Norfolk Coast SPA also supports very large assemblages of wintering birds, including in excess of 44,000 Pink-footed Geese, making it the second most important area for the species in the UK (Frost et al 2020). Internationally important numbers of six other species – Dark-bellied Brent Goose, Teal, Knot, Bar-tailed Godwit, Black-tailed Godwit and Ringed Plover - also occur.

The Ouse Washes SPA and Nene Washes SPA are particularly notable for assemblages of wintering wildfowl with a five-year peak count of 23,268 Wigeon occurring at the Ouse Washes as well as internationally important numbers of both Bewick's (1,911) and Whooper Swans (8,063) and five other species – Teal, Shoveler, Pintail, Pochard and Black-tailed Godwit. The Nene Washes also support internationally important numbers of Whooper Swans (1,244) and Bewick's Swans (354) as well as Black-tailed Godwits. Large numbers of numbers of Wigeon (13,510) and other wildfowl species also occur.

Meanwhile Breydon Water and Berney Marshes SPA, an extensive area of intertidal mud and saltmarsh (375 hectares) and wet grassland (550 hectares), in the south-east of the Norfolk and Suffolk Broads, supports up to 100,000 wintering wildfowl and waders, including large numbers of Wigeon (five-year peak count mean = 28,723), Pink-footed Goose (16,518) and Teal (3,345) (Frost et al. 2020).

It is important to assess the potential impact of White-tailed Eagles on these wintering bird assemblages in two ways – through direct predation and also disturbance.

Given the very large populations of migratory geese and wildfowl, the limited food requirements of a small population of White-tailed Eagles during winter and the species' penchant to favour the most seasonally abundant prey (Ekblad et al. 2016) it seems likely that predation will have a negligible effect and certainly no discernible impact at a population level. Nevertheless, it is important to consider that there has been a decline in Dark-bellied Brent Goose numbers wintering in The Wash in recent years, with numbers halving from 20,731 in 2014/15 to 10,112 in 2018/19 (Frost et al. 2020). This may raise concerns that White-tailed Eagle predation could intensify existing pressures on the population. However, evidence from Europe indicates that hunting eagles will tend to target injured, sick or dying waterfowl when foraging, as observed in Denmark where there is a rapidly increasing population of over 100 pairs of White-tailed Eagles (A. Fox pers. comm. 2019). White-tailed Eagles and Dark-bellied Brent Geese also coexist in the Netherlands and there is no evidence of any detrimental effects (D. van Straalen pers. comm. 2019). It is highly unlikely that a small reintroduced population of White-tailed Eagles which predominantly target weaker individuals - which ultimately may die anyway - could exert population level impacts, even in the context of this recent decline in numbers of Dark-bellied Brent Geese.

White-tailed Eagles predate both babbling and diving ducks across their European range (Nadjafzadeh et al. 2015, Ekblad et al. 2016, van Rijn and Dekker 2016), and are likely to favour the most numerous and widespread species. Given that Wigeon are particularly abundant in the region, with a wintering population in excess of 60,000 birds around the Wash, North Norfolk coast and Ouse and Nene Washes (Frost et al 2020), and predated elsewhere in Europe (Dementavičius et al. 2020), it is very likely that they will be a key prey species. Teal are also abundant and widespread in the region during winter with a five-year mean peak of 6,280 on the North Norfolk Coast and 7,972 on the Ouse Washes, and close to 3,000 birds at both the Wash and Nene Washes. Like the migratory geese, the large wintering populations of these two dabbling ducks will inevitably include sick and injured birds

which will be particularly susceptible to predation by White-tailed Eagles. This, combined with the sheer size of the wintering populations mean that predation is highly unlikely to have a detrimental impact at either a local or population level.

Evidence from various studies of White-tailed Eagle diet (section 2.2) indicate that waders such as Black-tailed Godwits are less likely to be taken than ducks and geese, and these species are far more likely to be predated by Peregrines *Falco peregrinus* instead. For example, an analysis of prey remains of wintering White-tailed Eagles in the Netherlands demonstrated that although species such as Lapwing and Redshank *Tringa tetanus* are occasionally taken, White-tailed Eagles predominantly favour ducks and geese (van Rijn et al 2010).

In addition to direct predation of wintering birds, a reintroduced population of White-tailed Eagles could exert additional pressure through disturbance. Disturbance can mean, in its broadest sense, any event that leads to a change in behaviour or physiology (Collop et al. 2016). It may lead to cause a variety of responses, ranging from a simple reduction in feeding time (Gill et al. 1996) to increased energy expenditure through locomotion (Houston et al. 2012), or in the most extreme cases – usually the result of anthropogenic disturbance – displacement from favoured foraging grounds (Burton et al. 2002). It is important to consider, however, that, unlike anthropogenic disturbance, attacks by a native predator are a normal occurrence for wintering bird assemblages, and that the migratory species that occur in eastern England will encounter White-tailed Eagles elsewhere in their migratory range.

Evidence from the Netherlands indicates that disturbance to wildfowl and waders by the White-tailed Eagles is similar to that caused by Peregrines and Greater Black-backed Gulls *Larus marinus*, and wintering birds become accustomed to their presence (D. van Straalen pers. comm. 2019; also see Appendix 2). Another important consideration is that White-tailed Eagles are often inactive for long periods. During a recent study in Germany Nadjafzadeh et al. (2016) found that White-tailed Eagles allocated 93.2% of their diurnal time perching or standing. The authors conclude that this ‘sit-and-wait’ for prey strategy seems to be a low-cost, highly profitable foraging mode in eagles and is similar to behaviour reported for the closely

related Bald Eagle *Haliaeetus leucocephalus* which was found to spend 94.3% of diurnal time perched (Watson et al. 1991). A recent analysis of the behaviour of the White-tailed Eagles released on the Isle of Wight in 2019 also corroborates these findings. Three birds carrying transmitters with a capacity for high temporal resolution data (one GPS fix per 2-3 minutes when battery voltage highest) spent a mean 91.7% of diurnal time perched between release in August 2019 and December 2020. Furthermore, during the period when G393 was in West Norfolk it spent 91.6% of diurnal time perched (Table 4).

Table 4. Daily time budgets of three immature White-tailed Eagles from the Isle of Wight (August 2019 - December 2020)

	G393 (m)	G393 Norfolk only	G274 (m)	G318 (f)	Mean
Number of days	487	141	487	488	
Total daytime GPS fixes	73799	21404	60565	25763	
Total GPS fixes perched	67435	19606	54410	24187	
Percentage perched	**91.4%**	**91.6%**	**89.8%**	**93.9%**	**91.7%**
Total GPS fixes flying	6364	1801	6155	1576	
Percentage flying	**8.6%**	**8.4%**	**10.2%**	**6.1%**	**8.3%**

This behaviour means that disturbance from White-tailed Eagles is less regular than other avian predators such as Peregrine, Marsh Harrier *Circus aeruginosus* and Greater Black-backed Gull which are on the wing for longer periods each day, hunt by active flight and are already widespread around the Wash and the wider region.

Disturbance by White-tailed Eagles is not considered an issue by Dutch researchers at internationally important wetland sites such as Krammer-Volkerak (D. van

Straalen pers. comm. 2019). This SPA and Nature 2000 site (https://eunis.eea.europa.eu/sites/NL1000021) has a very similar species assemblage to sites in eastern England, with large numbers of Dark-bellied Brent Geese, Teal, Black-tailed Godwit and Ringed Plover all present along with resident White-tailed Eagles. It is also important to consider that migratory species such as Brent Geese encounter White-tailed Eagles across their migratory range. The breeding range of the two species overlaps in some parts of Arctic Russia and the migrating Brent Geese may encounter White-tailed Eagles at many sites on the flyway through the White Sea and Baltic Sea, and along the North Sea coast. As already noted, there is no evidence that White-tailed Eagles have had a negative impact on flocks of staging Dark-bellied Brent Geese in the Danish Wadden Sea in autumn, either through predation or disturbance (A. Fox pers. comm. 2019). Monitoring at sites such as Newtown Harbour on the Isle of Wight has demonstrated that wintering birds have become habituated to the regular presence of White-tailed Eagles and this further reduces the potential for disturbance (Figure 17).

During the public consultation concerns were expressed about the potential for White-tailed Eagles to disturb very large flocks of wintering Pink-footed Geese that congregate in Norfolk and Lincolnshire. Like Brent Geese, the ranges of White-tailed Eagles and Pink-footed Geese overlap across their migratory range. Large numbers of wintering Pink-footed Geese from the breeding population in Svalbard winter in Denmark and the Netherlands where they coexist with White-tailed Eagles in many areas. In Denmark recent increases in the White-tailed Eagle population mean that there is a wintering population of at least 400 birds, with particular aggregations in the Danish Wadden Sea (A Fox pers. comm. 2019). This increase has coincided with significant increases in the number of Pink-footed Geese wintering in the region. Approximately half of the Pink-footed Geese migrating to Denmark now remain for the whole winter, compared to just 7% ten years previously (Clausen et al 2018). This change has been linked to a growing number of maize fields in the country. Maize crops are harvested later than most cereal fields, and therefore there is an increase in winter food availability, meaning the geese do not need to migrate further south (Clausen et al 2018). The fact that this change has occurred during the period when White-tailed Eagles have also been increasing rapidly indicates that, as with

Brent Geese, the presence of White-tailed Eagles is unlikely to have a detrimental impact on Pink-footed Geese either through predation or disturbance.

Figure 17. Species such as Dark-bellied Brent Geese, Oystercatcher and Curlew have become accustomed to the regular presence of White-tailed Eagles at Newtown Harbour NNR on the Isle of Wight, where hunting eagles employ the 'sit-and wait' technique, by perching on fence posts in the estuary.

One possible cause of anthropogenic disturbance indirectly related to the presence of White-tailed Eagles might be birdwatchers or other members of the public attempting to view the eagles in areas with large winter bird assemblages. It will, therefore, be important to establish designated eagle viewpoints once the birds have been released to ensure that eagle tourist do not themselves create disturbance to winter bird assemblages. This issue is covered in the project's Visitor Management Strategy (Appendix 4).

3.4. Breeding terns and gulls

In addition to supporting large winter bird assemblages, the Norfolk and Lincolnshire coasts support nationally important colonies of breeding Little Tern *Sternula*

albifrons, Sandwich Tern *Thalasseus sandvicensis* and Common Tern *Sterna hirundo*. The recent designation of the Greater Wash SPA, protects important foraging areas of the largest population of Little Tern in the UK marine SPA network (798 pairs), accounting for 42% of the UK breeding population (https://jncc.gov.uk/our-work/greater-wash-spa/), while this area also provides foraging habitat for 38% of the UK Sandwich Tern breeding population (https://jncc.gov.uk/our-work/greater-wash-spa/). The SPA designation of North Norfolk Coast SPA references all three species, while Gibraltar Point SPA also holds an important breeding colony of Little Terns.

In view of the significance of the area for breeding and foraging terns it is important to consider any potential impacts of releasing White-tailed Eagles, particularly in relation to direct predation and disturbance that could potentially leave vacated nests at greater risk of predation by opportunistic species, such as corvids. The project team has previously discussed these issues with biologists in the Netherlands (see Appendix 2) and Denmark, where tern colonies are often situated in close proximity to active White-tailed Eagle nests. In the Netherlands, field studies have demonstrated that foraging White-tailed Eagles tend to avoid areas with large colonies of terns and gulls, likely due to mobbing behaviour by these species (D. van Straalen pers. comm. 2019). Little Tern and Common Tern are referenced in the Natura 2000 designation of Krammer-Volkerak (https://eunis.eea.europa.eu/sites/NL1000021) and there have been no adverse impacts associated with recent increases in the numbers of breeding and summering White-tailed Eagles. In Denmark, there has been a rapid increase in the population of breeding White-tailed Eagles in the last 30 years, and there are now more than 100 breeding pairs, and also a large pool of non-breeding sub-adults. The eagles favour offshore islands and islets for resting, where they potentially compete for space with breeding terns and gulls. However, there has been only one case on an island in Mariager Fjord in eastern Jutland where the increasing presence of eagles may have resulted in the eventual abandonment of a colony of Sandwich Terns. Biologists who monitor colonial nesting species in Denmark are not aware of any other examples of colony desertion by gull and tern species due to eagle presence. In fact, there are several island sites, which eagles frequent throughout the summer,

which retain their breeding gull and tern colonies (A. Fox pers. comm. 2019, Dennis et al 2019).

Similarly, there has been no evidence of the Isle of Wight birds visiting tern or gull colonies since release. There is a large colony of breeding Black-headed Gulls at Newtown Harbour National Nature Reserve but satellite tracking data showed that the immature White-tailed Eagles released in 2019 avoided this area during the breeding season, instead favouring posts > 500 metres further into the estuary (Figure 18). The eagles were observed diving from these posts to catch Grey Mullet on a frequent basis. Similarly, there has been no evidence of released birds visiting tern and gull colonies elsewhere in the Solent SPA.

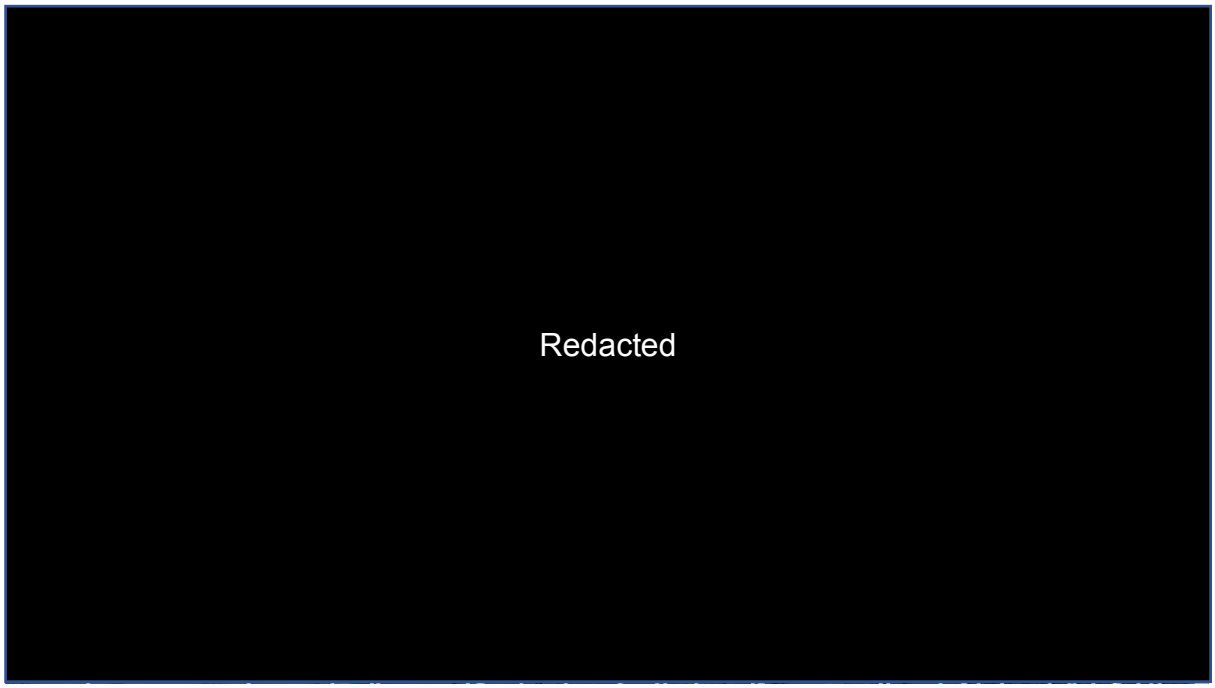


Figure 18. Movements of G274 [redacted]. The data shows that the birds avoided the gull colony, instead favouring posts in the estuary.

The fact that White-tailed Eagles actively avoid tern and gull colonies in both the Netherlands and Denmark is reassuring, and indicates that the presence of a reintroduced population of White-tailed Eagles is likely to have no impact on breeding terns in eastern England.

3.5. Lagomorphs

Lagomorphs have constituted a key element of the diet of White-tailed Eagles since release on the Isle of Wight, and it is likely that this will also be the case in West Norfolk and the wider region. One bird, in particular, G318, has predominantly favoured inland areas since release, and nearly always sites with locally abundant lagomorph populations. It is notable that this bird was present in Lincolnshire from late September 2020 until the end of January 2021 and favoured an area in the [redacted] Lincolnshire Wolds, [redacted]. Here the bird was been observed catching and feeding on Brown Hares and Rabbits on a regular basis (D Satterthwaite pers. comm. 2020).

In Norfolk, The Brecks and nearby Thetford Forest, situated 40-50 km south of Ken Hill, may become a favoured area for some eagles after release. The dry heath and grassland of this region supports significant rabbit populations, which are known to play a key ecological function. Intermediate rabbit grazing pressure on grassland communities produces the highest species diversity by maintaining a low sward height and preventing succession (Ranwell 1972), which in turn favours many short-sward invertebrates that can only persist in the presence of rabbits (Lees and Bell 2008). Birds of conservation concern, including Stone Curlew *Burhinus oedicnemus* and Woodlark *Lullula arborea* are also known to benefit from the presence of Rabbits in the Brecks. The Rabbit's other key ecological function is as a prey item for a range of species including Common Buzzard and Red Kites (Lees and Bell 2008). This is analogous with its role as a keystone species in Iberia where it appears in the diet of over 40 different vertebrate predators (Delibes and Hiraldo 1981) including two globally endangered species, the Iberian Lynx *Lynx pardinus* and Spanish Imperial Eagle *Aquila adalberti* which prey almost exclusively on them (Palomares et al. 2001; Ferrer et al. 2003).

The ecological importance of the European Rabbit in the Brecks means that it is important to consider the potential impact of White-tailed Eagle predation. Our view is that although individual White-tailed Eagles may become lagomorph specialists for some periods of the year, the broad, generalist diet of the species means that this is highly unlikely to have an impact on rabbit abundance at a population level,

particularly in view of the species' rapid breeding cycle. Furthermore, given that White-tailed Eagles will almost certainly chose to construct nests within a few kilometres of water, as observed elsewhere in their European range, breeding pairs are highly unlikely to specialise on Rabbits exclusively, even if they do form a significant proportion of the diet at certain times of the year.

Brown Hares, like Rabbits, are widespread in West Norfolk and the wider region (Norfolk & Norwich Naturalists' Society 2017) and were taken by immature male G393 while it was at [redacted] in West Norfolk. Like rabbits, Brown Hares are likely to be predated throughout the year, but it is highly unlikely that a small population of reintroduced White-tailed Eagles will have a discernible impact at a population level given the status of Brown Hares in the region. There is some concern that the recent spread of RHDV2 from Rabbits to Brown Hares will continue to lead to increased mortality in the UK population (Bell 2019), but the widespread and locally abundant population in eastern England is likely to be robust enough to withstand this, even when combined with some predation by White-tailed Eagles. Furthermore, infected animals will be more readily caught by White-tailed Eagles and this may potentially reduce spread of the disease between animals, by removing infected individuals from the population.

It is also important to consider that, as apex predators, White-tailed Eagles have the potential to supress the populations of mesopredators, such as Common Buzzard, which also predate rabbits. It might be argued, therefore, that in this situation rabbit predation by White-tailed Eagles could, in some localised cases, be offset by predation of Common Buzzard nestlings.

3.6. Potential predation of mesopredators

In recent years the Common Buzzard has become the UK's most numerous bird of prey, following a 194% increase recorded during 1995-2015 (Massimino et al 2017). The breeding population is estimated to number approximately 80,000 breeding pairs (Walls and Kenward 2020). The species is now widely distributed throughout eastern England, and continuing to increase in many areas, despite exceeding predicted mean saturation densities (Border et al. 2018). This suggests that numbers

have not yet reached a plateau as has been observed in western parts of the UK (Border et al 2018).

As discussed earlier, Common Buzzard nestlings are predated by White-tailed Eagles in other parts of their European range, including Germany (Neumann and Schwarz 2017) and Lithuania (Kamarauskaitė et al. 2020), particularly in areas with high Buzzard abundance. Buzzards were found as prey items in 16.4% of White-tailed Eagle nests situated in areas with the highest Buzzard abundance (82 pairs per 100 km²) in Lithuania (Kamarauskaitė et al. 2020). The expected mean density of breeding Buzzards in the 100km square in which the release site is located - and thus breeding White-tailed Eagles are most likely to settle - is 122 pairs per 100 km² (Border et al 2018). It seems likely, therefore, that as a breeding population of White-tailed Eagles become established some Buzzard nestlings will be predated. While this may have some local effects, it is unlikely that this will interrupt the ongoing recolonisation of eastern England, particularly as the species has already surpassed the expected mean population mean saturation density and is continuing to increase towards the predicated maximum (Border at al 2018).

Of greater concern than Common Buzzard predation might be that of other, scarcer mesopredators, such as Red Kite, Marsh Harrier and Hen Harrier *Circus cyaneus*. Red Kites have expanded their range into Norfolk, Lincolnshire and other parts of eastern England following successful reintroduction projects, including those in Northamptonshire and Yorkshire, and are now widely dispersed and increasing in the region (Massimino et al. 2019). They occupy similar habitat and have similar breeding habits to Buzzards, and, as such, may be deemed to be at risk of White-tailed Eagle predation. However, there is no evidence of this occurring in Europe. The Lithuanian study makes specific reference to the fact that other mesopredators were not taken despite the fact that both Red Kite and Black Kite, Northern Goshawk, Honey Buzzard and Lesser Spotted Eagle, all occur in the study area. Indeed, the only raptors/owl remains recovered from nests were a single fledgling Tawny Owl and one adult Kestrel. Similarly, in an extensive study of White-tailed Eagle diet in Lithuania, undertaken between 1997 and 2018, 2272 prey items recovered from active nests were identified, where possible, to species level. The remains of 36 Common Buzzards were identified along with 3 Kestrels, but no other

raptors were recorded as prey (Dementavičius et al. 2020). Likewise in Scotland diurnal raptors and owls were found to constitute just 0.6% of the diet of White-tailed Eagles in Scotland, compared to 4.3% for Golden Eagles (Whitfield et al 2013). It is thought that the local abundance of Common Buzzards, synchronicity of breeding cycles of the two species, and, crucially, weak Common Buzzard brood defence, were the key contributing factors to the predation recorded in Lithuania (Kamarauskaitė et al. 2020). Common Buzzards are also known to be predated by White-tailed Eagles in Germany (Neumann and Schwarz 2017) (where there are 600 + breeding pairs (Birdlife International 2015)), but there is no evidence of Red Kites being taken, despite the fact that the German Red Kite population numbers between 10,500 and 12,500 breeding pairs and constitutes approximately 50% of the European population (Knott et al 2009). It seems reasonable to predict therefore, that while some isolated cases of Red Kite nestling predation cannot be ruled out, it is highly unlikely that the reintroduction of White-tailed Eagles to eastern England would limit the continued expansion of the population.

Similarly, we do expect there will be any issues with either Marsh Harriers or wintering Hen Harriers following the release of White-tailed Eagles at Ken Hill. There has been a large increase in the breeding population of Marsh Harriers in the UK since 1996, with an estimated 590 to 695 pairs in 2016, and East Anglia is a particular stronghold for the species (BTO 2021). Whist it is conceivable that Marsh Harrier nestlings could be predated by White-tailed Eagles, there is no evidence that this occurs in Europe. The two species coexist at many wetland sites with no reported problems. It is also important to consider that in Lithuania the highest rates of Common Buzzard predation occur in inland areas where Common Buzzard abundance is high, and the availability of alternative prey is lower (Kamarauskaitė et al. 2020). Extensive studies of the diet of White-tailed Eagles demonstrates that they favour the most seasonally abundant food and favour fish and waterbirds during the breeding season (Ekblad et al. 2016, Dementavičius et al. 2020). This is very likely to be the case in eastern England where high alternative prey in areas where the two species will co-exist, makes it highly unlikely that White-tailed Eagles will predate Marsh Harrier nestlings. Furthermore, even if isolated predation did occur, it would be extremely unlikely to have population level effects given the current status of the Marsh Harrier population in the UK. To put any potential risk into context,

Lithuania, has approximately 150 pairs of breeding White-tailed Eagles (Dementavičius et al. 2020) and 3500-4500 breeding pairs of Marsh Harriers (BirdLife International 2015) - which is considerably larger than the corresponding figure for the UK (590-695). If predation of Marsh Harrier has not been reported under these circumstances (or elsewhere in Europe), it is similarly highly unlikely to occur in England.

Likewise, it is highly unlikely that White-tailed Eagles would predate wintering Hen Harriers which occur at various localities in eastern England. The only situation where predation could conceivably occur is when harriers are at roost. However, there is no evidence of this elsewhere in the White-tailed Eagle's range and the abundance of alternative prey available for wintering White-tailed Eagles in eastern England (Section 2.3), makes it extremely unlikely that predation of wintering Hen Harriers would occur.

3.7. Breeding waders

Several SPA sites in the region are important for breeding waders. The Ouse Washes SPA and Nene Washes SPA are particularly notable as breeding sites of Black-tailed Godwits which are currently the focus of considerable conservation effort, through Project Godwit, which includes head starting of chicks (https://projectgodwit.org.uk/project-godwit/). Likewise, eastern England is one of the strongholds of the UK population of breeding Stone Curlew with up to 250 pairs centred on the Brecks on the Norfolk-Suffolk border (www.rspb.org.uk). This population along with others in southern England, has benefitted from significant conservation interventions in recent years (https://www.rspb.org.uk/globalassets/downloads/documents/conservation-projects/stone-curlew-laymans-report.pdf). [redacted] were recorded at Ken Hill in 2019 and 2020, and the estate has also been chosen as a potential release site for [redacted]. It is therefore extremely important to consider whether establishing a breeding population of White-tailed Eagles could have any implications for these ongoing efforts, or for the conservation of other breeding waders in the region.

Waders are occasionally taken by White-tailed Eagles, but evidence from other European populations indicates that they always favour waterfowl (Ekblad et al. 2016; van Rijn and Dekker 2016). This is best exemplified by recent data from the Netherlands where a total of 491 individual birds of 25 bird species were identified as prey in active White-tailed Eagle nests. The only waders recorded were a single Lapwing and a single Redshank, with White-tailed Eagles showing a clear preference for wildfowl, with Greylag Goose and Coot the most frequently predated species (van Rijn and Dekker 2016). These findings are pertinent given the similar species assemblages of eastern England and the Netherlands. Similarly, waders were found to represent just 1% of White-tailed Eagle diet in Lithuania (Dementavičius et al. 2020). A total of 24 waders of seven species (Ruff *Philomachus pugnax* 3, Lapwing 11, Snipe *Gallinago gallinago* 2, Woodcock *Scolopax rusticola* 2, Curlew 1, Wood Sandpiper *Tringa glareola* 1, Sandpiper sp. 3, Black-tailed Godwit 1) were identified as prey remains in a comprehensive study which analysed a total of 2,272 prey items recovered from active nests (Dementavičius et al 2020). Likewise at the Danube Delta, *Charadriiformes* (waders, gulls and auks) constituted just 0.38% of White-tailed Eagle diet (i.e. total of all taxa) with Coot (9.6%) and Mallard (3.5%) the most frequently predated bird species.

This evidence suggests that although some waders may occasionally be opportunistically taken, particularly if they are sick or injured, it is highly unlikely that the reintroduction of White-tailed Eagles will have a detrimental impact at a population level on any species, and particularly those of conservation concern. Likewise, we do not consider that releasing White-tailed Eagles at Ken Hill will have a detrimental effect on [redacted]. Furthermore, evidence from the Isle of Wight project indicates that juvenile White-tailed Eagles do not begin catching live prey until some months after release, and, as such, are dependent on food provisioned by the project in the initial post-release phase, when any [redacted] may be present in the local area.

Like with gulls and terns, another potential impact of White-tailed Eagles is disturbance leading to predation by opportunistic species, such as corvids, when

nests are temporality vacated. Whilst this cannot be ruled out completely, the White-tailed Eagle's preference to use the sit and wait strategy for hunting (Nadjafzadeh et al. 2016), and the limited amount of diurnal time that is spent in flight (Table 4), reduces this risk considerably and almost certainly excludes any detrimental impacts at a population level.

3.8. Marine and freshwater fish

Fish constitute a key part of the White-tailed Eagle's diet across its European, and so it is important to consider the ecological impacts of this. The coastal nature of the proposed release site means that marine fish are likely to be taken by sub-adult birds as well as established breeders. The very nature of the White-tailed Eagle's foraging habits mean that they are likely to target the most seasonally-abundant and easily-caught species, such as Grey Mullet and European Bass, as also observed around the coasts of the Isle of Wight. Whilst it is highly unlikely that a reintroduced population of White-tailed Eagles could have any discernible impact on these species, there is potential for other marine species to be caught. One potential prey species that is the subject of particular conservation effort in recent years is the Sea Trout. The Anglian Rivers Sea Trout Project is a collaborative partnership between anglers, fishery scientists and managers, conservationists, landowners and local communities. Its aim is to conserve and improve the habitat and wildlife of four North Norfolk Rivers (the Glaven, Stiffkey, Burn and Nar), and the Great Eau and Welland in Lincolnshire, using Sea Trout stocks as a barometer of river health (https://www.wildtrout.org/content/anglian-rivers-sea-trout-project).

The lifecycle of Sea Trout begins in freshwater streams and rivers where juvenile fish hatch and grow for a period of 1-8 years before migrating out to sea. They remain at sea for 0.5-4 years where increased food abundance allows individuals to increase weight and length substantially (Kristensen et al 2018). They subsequently return to their natal river during summer and early autumn where they typically wait in deep pools with good overhead tree cover prior to spawning, which usually occurs from November onwards. Many kelts (adults which have spawned) return to the sea for a period after spawning, although they generally remain there for a shorter period - typically 2-6 months - than first time migrants (Kristensen et al 2018).

Spawning fish typically prove relatively easy prey, but it is unlikely that White-tailed Eagles will predate Sea Trout while they are upstream in rivers because they prefer larger more open expanses of water when hunting, as observed elsewhere in the European range (Nadjafzadeh et al 2015, Källander 2018). Nevertheless, evidence from the Isle of Wight indicates that Sea Trout might be predated during periods when they are in estuaries or relatively close off-shore. Kristensen et al (2018) found that the mean duration of the marine/estuarine period for Sea Trout kelts was 109.3 days and that tagged fish spent 63.8% of time within 3 metres of the surface. Even if some individuals are taken during this period, it is highly unlikely that this would have any impact at a population level given that predation will only occur for a period of 3-4 months each year, and that a range of alternative and, potentially, more easily-caught species, such as Grey Mullet, are present around the coast.

Opportunities for freshwater fishing in the area where initial settlement is expected (i.e. within 50 km of the release site) are relatively limited. However, as the population becomes established and expands geographically, it is likely that some breeding pairs will settle in the Norfolk and Suffolk Broads. There is also potential for White-tailed Eagles to spread to inland reservoirs, such as Rutland Water in Rutland and Grafham Water in Cambridgeshire. European studies have shown that a range of freshwater fish are taken according to availability but favoured species include Northern Pike, Roach, Bream and Carp, with fish accounting for up to 50-60% of the diet during summer (Nadjafzadeh et al. 2015, van Rijn and Dekker 2016, Ekblad et al 2020). Surveying by the Environment Agency has shown that these species are widespread and numerous in the Norfolk and Suffolk Broads (Environment Agency 2020b) and, as such, predation by a limited number of White-tailed Eagles that may eventually settle in the area is highly unlikely to have population-level effects. Similarly, if White-tailed Eagles spread to inland reservoirs to the west, such as Rutland Water and Grafham Water it is highly unlikely that they will have a detrimental impact on fish populations, particularly given the generalist diet of the species, and the fact that these sites are only likely to support isolated breeding pairs. Many of these inland reservoirs are stocked with Rainbow Trout for angling but also support significant populations of various other freshwater species, including Common Bream, Northern Pike, and Roach. These species are regularly caught by

Ospreys breeding at Rutland Water for example and also help sustain a breeding population of 50-75 pairs of Cormorants (Mackrill et al. 2013).

3.9. Common Cranes

Eastern England supports a growing population of Common Cranes and concerns were raised during the public consultation about potential White-tailed Eagle predation given that the Norfolk and Suffolk Broads, in particular, is a stronghold for the species.

Successful breeding of Common Cranes first occurred at Horsey in the Norfolk Broads in the 1982 and the population has since expanded to other wetland sites in the region, including RSPB nature reserves at Lakenheath and the Nene Washes in the East Anglian Fens, an area which was colonised in 2007 (Standbury et al 2011). Overall, 2020 was the best year on record in the UK with 64 breeding pairs rearing at least 23 chicks (https://www.rspb.org.uk/about-the-rspb/about-us/media-centre/press-releases/uk-crane-population-hits-record-high/).

Diet studies demonstrate that White-tailed Eagles are capable of predating juvenile Common Cranes, but that they are only occasionally taken, even in areas where both species are numerous. For example, in an extremely detailed study of the diet of White-tailed Eagles in Lithuania covering 302 successful breeding attempts at 60 nests (approximately one third of the national population) over a 21-year period between 1997 and 2018, the remains of seven Common Crane were recovered from nests. This represents only 0.3% of the prey items identified to lower taxonomic level during the study (n = 2,272) (Dementavičius et al. 2020), despite the fact that Common Crane is abundant, with a breeding population of 5,000-10,500 breeding pairs (Birdlife International 2015). The study found that Coot was the most frequently predated avian species (156 individuals = 6.9% of overall total), and that fish were favoured during the breeding season with Northern Pike (424 individuals, 18.7%) and Common Bream (226 individuals, 9.9%) the most frequently predated species. It is very likely that any breeding White-tailed Eagles that settle in the Norfolk and Suffolk Broads would also favour freshwater fish. Furthermore, given that the Common Crane population in the UK is 0.6-1.3% the size of the population in

Lithuania, and that the project aims to establish an initial population of 6-10 pairs of breeding White-tailed Eagles in eastern England, (compared to 125-150 pairs in Lithuania (Birdlife International 2015)), it is highly unlikely that White-tailed Eagles will predate Common Cranes, and, as such, will have no detrimental effect on the continued increase in the breeding population of the species.

3.10. Beavers at Ken Hill

In 2020 the Ken Hill Estate released Eurasian Beavers *Castor fiber* under licence from Natural England into an enclosure in an area of wet woodland on the estate. Four animals are currently in the enclosure. It is important to state that the planned White-tailed Eagle project will not impact on the Beavers in any way. The 60 acre Beaver enclosure is situated within a heavily wooded plantation and, given the dense structure of understory and enclosed nature of the woodland, it is unlikely that the eagles will use this area for perching. Even if the juvenile birds do occasionally perch in the vicinity once they have been released, they will have no impact on the Beavers.

3.11. Conclusion

An essential element of any reintroduction is to give careful conservation to the potential ecological impacts of the project. The White-tailed Eagle is a native species that was once widespread in eastern England, and it is important to consider that individuals from continental Europe and, more recently, the Isle of Wight have been recorded in the region on an increasingly frequent basis in recent years. Nevertheless, establishing a breeding population is clearly a step change compared to the sporadic occurrence of sub-adult birds.

The evidence considered here, coupled with detailed monitoring of the Isle of Wight birds since release indicates that the reintroduction poses no significant ecological threat, and may in some cases, actually provide local benefits through predation of feral geese and, potentially, mesopredators such as widespread and abundant corvids, as well as, perhaps, Common Buzzards. The overwhelming evidence from various European studies is that the White-tailed Eagle favours the most seasonally-

abundant prey, and as such, it is highly unlikely to have an impact on threatened or rare species. It is understandable that concerns were raised during the public consultation about potential threats to Spoonbill and Common Crane in particular, but we believe that the evidence considered here demonstrates that these species are able to coexist successfully with White-tailed Eagles across Europe. In addition, the White-tailed Eagle's preference to utilise the 'sit-and-wait' method for hunting prey, which results in > 90% of diurnal time spent perched, coupled with the fact that local breeding and wintering species become habituated to their presence, is likely to minimise any impacts associated with disturbance during the breeding season, and also in winter when significant assemblages of birds are found in the region. Nevertheless, a comprehensive programme of monitoring will be undertaken during the course of the project, as detailed in the project's Monitoring and Evaluation Plan (Appendix 3) which will enable any local issues to be identified should they arise.

4. The socioeconomic feasibility of a White-tailed Eagle reintroduction

4.1. Potential socio-economic benefits

The White-tailed Eagle is an iconic species that is widely admired by birdwatchers and the general public alike. It is regarded as an important flagship species for wetland conservation across Europe (Sandor et al. 2015), acknowledging the notion that the conservation of charismatic top predators brings wider biodiversity conservation benefits (Sergio et al. 2006). Thus the restoration of White-tailed Eagles to West Norfolk and the wider region has the potential to raise the profile of the conservation and protection of coastal and wetland habitats. This would have knock-on benefits to a suite of threatened or declining species which share the same habitats. In this regard the White-tailed Eagle could be deemed an umbrella species, i.e. one whose habitat and area requirements are such that protecting it will aid a range of other species at the same time (Simberloff 1998).

In Scotland, White-tailed Eagles are known to be a major tourist attraction. For example, eagle-related visits generate up to £5 million tourist spend each year on the Isle of Mull alone, while supporting 110 local jobs (Table 5) (Molloy 2011). In a study carried out by the RSPB in 2011, 23% of visitors to the Isle of Mull were influenced to go there by the presence of White-tailed Eagles. Tourists travel from all over the UK to visit, with an average distance of 250 miles, but with some travelling more than 600 miles (Molloy 2011). Overall wildlife tourism is worth £276 million of spend per year in the Scottish economy and supports 2,763 FTE jobs (Molloy 2011). As such conservation of the local environment and the reintroduction of charismatic species can play a vital role in reinvigorating rural economies.

The socio-economic benefits of reintroducing charismatic species are well illustrated by the return of Ospreys to central England. The translocation of Ospreys to Rutland Water and subsequent establishment of a self-sustaining population, has had many direct and indirect benefits for the local community. Up to 30,000 people travel to Rutland to see the nesting Ospreys each year, and local hotels, B&Bs, pubs and restaurants all directly benefit as a result (Mackrill et al 2013). Up to 1,000 people go on special Osprey Cruises on the Rutland Belle each year, while an Osprey

photography hide at a local trout farm has proved a great success. Prior to the construction of the hide, predation by Cormorants, Otters, Grey Herons, Little Egrets and Ospreys was having a significant impact on fish stocks, but the income now generated by photographers more than off-sets any such losses. In fact, the hide has become an integral part of the business, accounting for a significant proportion of annual turnover (L Ball pers. comm. 2019) (https://www.rivergwashtroutfarm.co.uk/horn-mill-osprey-hide/).

Table 5. Spending by tourists visiting the Isle of Mull to see White-tailed Eagles (Molloy 2011).

How important were White-tailed Eagles in visitors' decisions to visit Mull	**Total % of visitor responses**	**% of spending attributed to White-tailed Eagles from these responses**		**Total expenditure attributed To White-tailed Eagles (£)**	
		Low	High	Low	High
One of the reasons	21.08	20	35	428,545	571,393
Main reason	1.23	60	90	2,448,165	4,284,289
Total	**22.31**			**2,876,710**	**4,855,683**

Tourism is already vitally important to the Norfolk economy. It is the largest sector industry in the county, supporting 69,266 jobs (19.5% of all employment) and contributing £3.423 billion to the local economy. Research estimates that in 2019 (i.e. pre-Covid) there were over 3.16 million overnight trips to the county, covering a total of 12.64 million nights, while the total number of day visitors was estimated at 48.84 million (Visit Norfolk 2020). Meanwhile in the Eastern region as a whole there were a total of 9.7 million overnight visits from people within the UK, covering 31.4 million nights (Visit Great Britain 2020). The region is widely regarded as one of the best birdwatching destinations in the UK, with the network of nature reserves along the Norfolk and Suffolk coasts, in particular, attracting large numbers of visitors each year. For example, a survey of six sites on the coast associated with landscape and

biodiversity estimated that the annual spend of visitors to these sites was £21 million which supports 442 full time jobs (Rayment et al. 2000). Given the current popularity of the area as a birdwatching destination, it is difficult to predict exactly what impact the reintroduction of White-tailed Eagle might have, but it is clear from evidence in Scotland, and the ongoing Isle of Wight project, that there is significant interest in the species, which will likely result in some incremental increase in visitors, although unlikely as large experienced in Scotland and the Isle of Wight given existing visitor volumes.

While an increase in visitors would have benefits to the local economy, it will be necessary to give careful consideration to how any increase in visitors is managed as a population of White-tailed Eagles becomes established in the area. With this in mind, a Visitor Management Strategy has been devised for the project (Appendix 4) and this will be kept under review as settlement patterns of the eagles emerge. The establishment of suitable White-tailed Eagle public viewpoints will, in time, be key in directing visitors to areas capable of accepting the additional footfall, and protecting private or sensitive sites from disturbance. Furthermore, the location of the translocated birds will not be publicised unless they are on nature reserves where the managing organisation has agreed to publicisation, or similar sites, with proper viewing/visiting facilities. This approach has been undertaken successfully with the ongoing Isle of Wight project.

A longer-term aspiration of the project is to establish a viewing site at an active nest, as has been implemented successfully in various locations, including the Isle of Mull (https://mulleaglewatch.com/). This would enable visitors to enjoy watching breeding eagles in a carefully controlled location. This approach has also been used with Ospreys at Rutland Water where a publicly viewable nest diverts attention away from other nests on private farmland. This nest is viewed by up to 30,000 people each year (Mackrill et al 2013).

There are other benefits of restoring lost species like White-tailed Eagles, that are far harder to quantify than, for example, an increase in visitor numbers and tourism spending. Early evidence from the Isle of Wight project is that the reintroduction of White-tailed Eagles to southern England is changing perspectives about how a

species like this can coexist with humans in a densely population anthropogenic landscape. The return of White-tailed Eagles has created great interest and significant support. For example, a recent social media post on the movements of G393 a White-tailed Eagle that was released on the Isle of Wight in 2019, had a combined reach of over 300,000 people on Facebook and Twitter combined, with all associated comments overwhelmingly positive. The project has also featured on *The One Show* and *Autumnwatch* on BBC television. The project received numerous reports of White-tailed Eagles that were observed from homes and gardens during the Coronavirus lockdowns. This provided a great morale boost during an extremely difficult time for many people and was featured on a Roy Dennis Wildlife Foundation podcast. The chance of encountering a species like the White-tailed Eagle in Norfolk, Lincolnshire or surrounding counties is one that will be relished by many people. The benefits of nature to mental health and wellbeing are now well known (Keniger et al 2013) and it is clear that the reintroduction of White-tailed Eagles to the Isle of Wight has enhanced the landscape, not only in the sense of restoring a lost native species, but in reinstating one that can create a sense of awe and wonder like few others.

4.2. Socioeconomic risks

4.2.1. Sheep farming

4.2.1.1. Sheep farming in Scotland

Although White-tailed Eagles take a diverse array of prey, there has been long standing debate in Scotland on the extent to which they predate lambs. Studies undertaken in western Scotland have demonstrated that lamb remains are found in White-tailed Eagle nests (see section 2.2), but concluded that the majority (up to 75%) had been scavenged rather than taken live (Marquiss et al 2004). Furthermore, there was circumstantial evidence that many of the lambs killed were not viable because, compared with live lambs, they were small for their age and similar to lambs lying dead on the hill from other causes (Marquiss et al 2004).

Some crofters have claimed that levels of predation have increased in recent years. In view of this further research was undertaken by Scottish Natural Heritage in the Gairloch area in 2009, following alleged large losses in 2008 (Simms et al 2010). In

this study a total of 58 radio tags, each fitted with a mortality chip that was triggered after two hours inactivity, were attached to lambs from three flocks on two crofts to enable any dead lambs to be located within a short time of death. Within the radio tracked study flocks, no lambs (including both tagged and untagged individuals) were taken by White-tailed Eagles during the study period. Furthermore, of six lambs found dead in the wider study area and sent for post-mortem only one (with poor body condition) had injuries indicating that it was likely killed by either a White-tailed Eagle or Golden Eagle (Simms et al 2010). There was no evidence to substantiate eagle predation for any other lamb carcasses or remains, although four of the examined carcasses did show signs of avian scavenger activity (White-tailed Eagles were recorded scavenging on two of these carcasses). In addition, a total of 224 vantage point surveys were undertaken during the study, amounting to 599.1 hours of observation. During this period, White-tailed Eagle activity was recorded for less than 2% of total observation time and no White-tailed Eagle predation was observed.

In recent years farmers and crofters in Scotland, have continued to raise concerns and in 2015 this led to the launch of the formation of the Sea Eagle Management Scheme, a joint initiative instigated by NatureScot (formerly SNH) and NFU Scotland (https://www.nature.scot/professional-advice/land-and-sea-management/managing-wildlife/sea-eagle-management-scheme). This extends support for livestock farmers and crofters who report impacts across the White-tailed Eagle breeding range. Farmers are asked to record details of flock management and lamb losses using a log template, and to include any evidence of livestock predation. Local stakeholder groups have been set up in several key areas and scheme advisors visit farms in order to:

- investigate what White-tailed Eagle activity is occurring near to the farm
- help to gather evidence of White-tailed Eagle impacts and record any livestock losses due to White-tailed Eagles or other causes
- advise on measures to mitigate against White-tailed Eagle impacts
- arrange to lend equipment, where appropriate, to use to deter White-tailed Eagles or otherwise mitigate impacts
- recommend support for longer term management agreed with, and carried out by, the livestock manager

More recently NatureScot and partners have begun trialling new methods aimed at reducing the impact of White-tailed Eagles on sheep farming. This has included the licenced removal of previously-used nest sites and new audio and light-based scaring methods (https://www.nature.scot/white-tailed-eagle-action-plan-review-2020#F5). Funding is available to support a range of measures to help support farmers and crofters manage land and livestock to mitigate the impacts of sea eagles. As of July 2020, the Sea Eagle Management Scheme had engaged with 164 holdings, covering 156,489 hectares and 71,516 breeding ewes. The scheme budget, funded by NatureScot, increased from £72,000 in 2015 to £225,000 in 2020.

Despite the reported problems, there remain very few observations of direct interactions between White-tailed Eagles and sheep, even in localities where observers spent significant amount of time in areas where White-tailed Eagle predation had been reported. As such one of the objectives of the revised Sea Eagle Management Scheme for 2020 onwards is to capture and tag adult birds to provide additional information to support management and monitor farm work. In addition, two PhD studies are underway, including one which is investigating causes of lamb loss on Highland farms and crofts, and quantifying the part that White-tailed Eagles may or may not play in these losses (NatureScot 2021).

4.2.1.2. Sheep farming in Ireland, Netherlands and the Isle of Wight

With the ongoing controversy and conflict in Scotland, the Irish White-tailed Eagle reintroduction was met with considerable opposition by the farming community when it was first proposed. In view of this, significant efforts were made by the Isle of Wight reintroduction project team to address these fears by meeting with farming groups and working with farmers locally where eagles took up residence. It is now more than 13 years since the first release took place and there were nine active nests in 2020. Four of those pairs went on to rear a total of five fledged young (Mee 2020).

In 2019 Project Manager Dr Allan Mee reported for the Isle of Wight feasibility report (Dennis et al. 2019) that, "*White-tailed Eagles are now seen as very much part of the landscape. In fact, in that time, we have had no proven case of an eagle taking a lamb, even where pairs are breeding in hill sheep areas. As has been seen in Norway, the eagles are well known to scavenge carrion including sheep and lamb*

carcasses. It has taken several years but I believe we can categorically state that there has not been the damage to farming interests that were feared initially and most sheep farmers are now either neutral or positive towards the eagles. Indeed, we are delighted that two sheep farmers are helping us to monitor eagle nests by watching nests in their area".

The changing attitudes of farmers in Ireland has also been covered in the Irish media. Two articles by Majella O'Sullivan in the Farming Independent in December 2017 were significant: "*From protests to partnerships: How farmers are supporting the reintroduction of the White-tailed Eagle*" (Figure 19) and "*They never touched a lamb: Lough Derg farmer on the reintroduction of the white-tailed eagle"*. The latter focused on the experience of one farmer on the Tipperary shore of Lough Derg, Joss Hogan, who has worked closely with the project team since the birds settled in the area in 2011/12. He has kept records of the birds and has had a positive influence on the wider farming community.

Figure 19. Article in Farming Independent in Ireland.

Significant concerns were raised by sheep farmers when the Isle of Wight was first proposed. As a result, Roy Dennis and Tim Mackrill immediately organised a visit to the Netherlands to learn how White-tailed Eagles lived in a highly anthropogenic landscape much more akin to southern England than western Scotland. They found that like in Ireland, there have been no cases of lamb predation in the Netherlands, where there are now 20 pairs of White-tailed Eagles on territory, nor any other conflicts with livestock or poultry farming of any kind. Sheep are frequently kept on the dykes to maintain short vegetation but there is no evidence of any lambs being taken even in areas where White-tailed Eagles are provisioning young (van Rijn and Dekker 2016). Further details of the visit are included in Appendix 2.

The Isle of Wight project's Steering Group includes members of the National Farmers' Union (NFU), National Sheep Association (NSA) and Hampshire Sheep Group to ensure that sheep farmers have a stake in the project. The project has also made a concerted effort to reach out to sheep farmers through visits to individual farms, and talks to larger groups. This has been met with a positive response, and, to date, there had been no evidence of predation of sheep or other livestock. Satellite tracking data enables the movements of all released birds to be monitored in detail and this provides reassurance to farmers. The project also has a clear reporting procedure to enable farmers to get in touch with the project team should any problems arise. On the only two occasions when concerns were reported, the Project Officer based on the Isle of Wight, has responded immediately. On one occasion six lambs had been lost to an unknown cause, but satellite data proved that there had been no visits to the area in question by White-tailed Eagles, and on a second occasion a White-tailed Eagle was present in a field of sheep, but had been hunting rabbits, with no evidence of any livestock predation. It is notable that as the Isle of Wight birds have become older and more adept at catching live prey, they have spent increasingly long periods around the coast, where fish have been caught throughout the year. The abundance of natural prey greatly reduces the chances of any conflict with sheep farming in the region, but the project team is committed to monitoring this issue in detail and to work closely with sheep farmers.

4.2.1.3. Sheep farming in eastern England

Sheep farming in eastern England (including Norfolk, Suffolk and Cambridgeshire) is relatively limited, with a total of 362,000 sheep equating to 2% to the national total (DEFRA 2020). In the neighbouring East Midlands region (which includes Lincolnshire) the proportion of grazing livestock is higher with a total of 1.27 million sheep (8% of national total) (DEFRA 2020).

Given the experiences to date in Ireland, the Netherlands and on the Isle of Wight, we are confident that there will be little or no conflict with sheep farming in eastern England. In the less favoured areas of Scotland hill sheep often lamb on open exposed slopes, away from farm buildings where they may be more exposed to bad weather, including late snows, and to predation. Even those that lamb close to the farm and are put out to the hill with their mothers may subsequently suffer from late snows and bad weather. In eastern England, larger breeds of sheep either lamb indoors or outside in enclosed fields. In addition, weather conditions are generally much more favourable and the sheep generally graze on grass pastures on richer soils. Although the timing of lambing does vary between farms, the availability of alternative and abundant prey sources in Norfolk and the wider East Anglian region is considerably greater than the west coast of Scotland, and this will further reduce any likelihood of White-tailed Eagles killing lambs.

As already stated, if a licence for the project is granted the project team will liaise closely with all members of the farming community from the outset, and respond to any concerns, should they arise. In addition, a formal reporting procedure has been devised, based on work undertaken on the Isle of Wight, so that there is a clear means by which any reported problems can be investigated, and mitigation measures put in place should they be deemed necessary.

4.2.2. Pig Farming

During the public consultation concerns were raised by some pig farmers about potential predation of outdoor-reared piglets by White-tailed Eagles. 26% of England’s pig farming occurs in the eastern region (including Norfolk, Suffolk and Cambridgeshire) with a further 9% in neighbouring East Midlands (including

Lincolnshire) (DEFRA 2020). Up to 40% of pigs in England are reared outdoors, and there are numerous outdoor pig rearing units in West Norfolk and the wider region. As such, it is important to consider what impact, if any, White-tailed Eagles might have.

Pigs represent the largest livestock category in the European Union, with 148 million pigs in 2018. Significant numbers are kept in Germany (26 million), Denmark (13 million) and Netherlands (12 million), meaning that together these countries account for more than a third of all pigs in the EU (Augère-Granier 2020). Denmark has the largest commercial holdings with an average of 4,700 head (Augère-Granier 2020). Germany and Denmark both have substantial populations of White-tailed Eagles (650 pairs and 100 pairs respectively (Birdlife International 2015)) and there is an increasing population of approximately 20 pairs in the Netherlands (van Rijn pers. comm. 2020).

Although the majority of pigs are kept indoors across Europe (c. 90%), the number of outdoor pig farms is increasing, mainly owing to a growing interest in organic farming systems (Juardo et al 2018). For example, 3% of Denmark's pig farms are now organic (Augère-Granier 2020). Clearly the fact that the majority of pigs are reared indoors across Europe, excludes the possibility of White-tailed Eagle predation, but even in areas where pigs are reared outdoors there has been no reported conflict with White-tailed Eagles.

Where pigs are kept outdoors in the UK, multiple breeding sows are usually kept in large fields, each within individual fenced enclosures with a shelter. On average each produces sow produces 2.2 litters and a total of 28.9 piglets per year with a pre-weaning mortality of 12.1%. Average weaning age is 26.4 days at an average weight of 7.5kg (AHDB 2020).

Although White-tailed Eagles are capable of taking relatively large prey, diet studies around Europe demonstrate that European Hares, (typically weighting 3-4 kg (Mammal Society 2021)) are usually the largest mammal they are capable of taking live. At least one of the birds released on the Isle of Wight, female G318, has been observed catching live hares on several occasions and hare remains were found

near a favoured perching site of G393 at [redacted] in Norfolk. Small piglets are thus within size range of White-tailed Eagles during their first one-two weeks. However, during this period they remain close to their mothers which would make any attack by a White-tailed Eagle extremely hazardous for the bird. Once piglets are weaned and taken away from sows they are too large for White-tailed Eagles to predate.

Taking this into consideration we consider it highly unlikely that a White-tailed Eagle would attempt to predate piglets, especially in an area like West Norfolk and the wider East Anglian region, where the availability of natural prey is abundant. This was exemplified by the behaviour of immature male G393 from the Isle of Wight, which was present in West Norfolk for a five-month period from August 2020. The bird spent prolonged periods at [redacted], where there are significant numbers of outdoor pigs, between [redacted]. During this period the bird fed primarily on Black-headed Gulls which it caught at a 4.5 hectare water storage reservoir where the gulls washed and roosted after feeding in nearby pig fields (Figure 21). Numerous Black-headed Gull remains were recovered from the bird's favoured perching sites, and the remains of a European Hare were also found on one occasion. Although there were no direct reports, the project team were made aware of concerns that the eagle may have been predating piglets during its stay. This issue was immediately investigated and satellite tracking data showed that the bird had not been present at times when suspected predation took place. This again highlighted the value of the high-resolution satellite data in addressing concerns raised about the presence of White-tailed Eagles in a specific locality. There were no reported issues of disturbance impacting sow productivity at [redacted], during the rest of the period G393 spent in Norfolk, or from any of the other birds released on the Isle of Wight since 2019.

The satellite tracking data also demonstrated that, when it wasn't present at the reservoir, G393 favoured perching sites on the edge of woods and in belts of trees (Figure 20). This typifies the sit-and-wait foraging method favoured by White-tailed Eagles, means that they are highly inconspicuous in the landscape and also significantly reduces the likelihood of disturbance at pig farms, a concern that was raised during the public consultation. Furthermore, there was no evidence of the bird

visiting fields with small piglets (or any pigs) despite the high temporal resolution of the data – with a GPS fix logged every five minutes.

Although we consider it highly unlikely that there will be conflict with pig farming, a representative from the pig farming community will be invited onto the project's steering group.

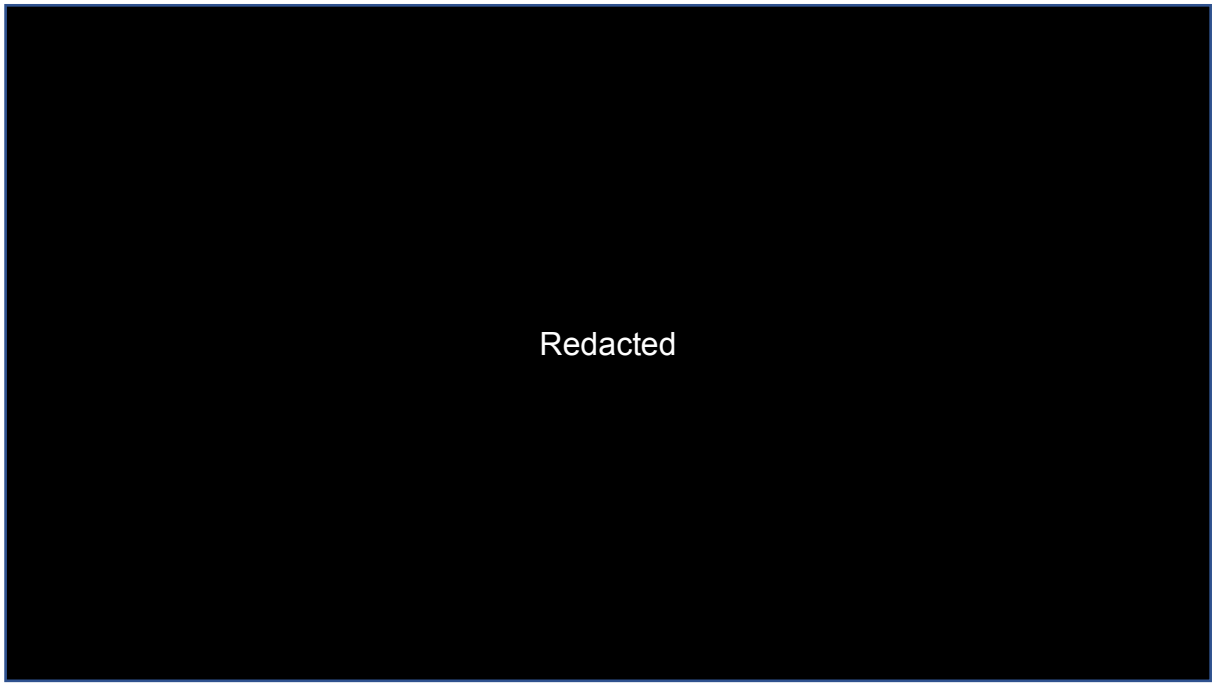


Figure 20. G393's core area at [redacted]. The bird primarily perched on the edge of woodlands and belts of trees, as well as around a 4.5 hectare reservoir (red triangle). There was no evidence of any predation of piglets during its stay.

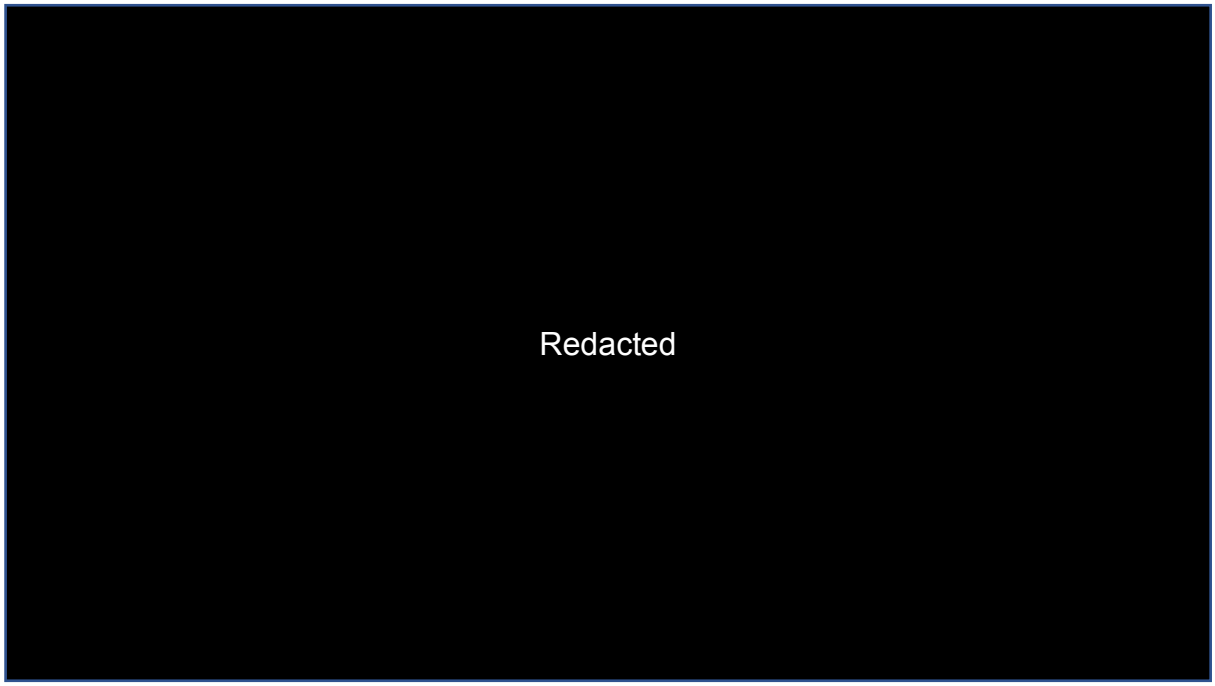


Figure 21. Close-up view of the [redacted]. The red circle shows a group of Scots Pines *Pinus sylvestris*, which was a favoured perching location for the bird. The remains of at least three Black-headed Gulls were located under these trees during a visit to this locality on [redacted].

4.2.3. Poultry Farming

Poultry farming is relatively widespread in West Norfolk and the wider area. DEFRA statistics show that the eastern region accounts for 21% of English poultry, including 41% of turkey farming (DEFRA 2020). Similarly, poultry farming in the neighbouring East Midlands (including Lincolnshire) also accounts for 21% of the overall English total (DEFRA 2020).

Free-range poultry meat accounts for just 3.5% of the UK market, but free-range hens produced 56% of eggs during the fourth quarter of 2020 (DEFRA 2021). Egg marketing legislation stipulates that for eggs to be termed 'free-range', hens must have continuous daytime access to runs which are mainly covered with vegetation and a maximum stocking density of 2,500 birds per hectare (egginfo.co.uk). Concerns were raised during the public consultation that the presence of White-tailed Eagles in eastern England may lead to predation and/or disturbance of these flocks. High stress levels among poultry can cause detrimental behaviours such as cannibalism.

Despite the concerns that were aired during the public consultation, monitoring across their European range suggests White-tailed Eagles pose little or no threat to free-range poultry. Evidence from countries such as Poland and Germany with large and widespread populations of White-tailed Eagles demonstrates there is no conflict with the industry, and extensive diet studies have not identified domestic poultry as prey in those countries, or elsewhere in Europe where welfare criteria for free-range poultry are the same as the UK (e.g. Anderwald et al 2013; Nadjafzadeh et al 2015). This is in contrast to other raptors, most notably Goshawk, which is known to predate domestic poultry in Poland (Gryz and Gryz 2019) and occasionally in the Netherlands (Bestman and Bikker-Ouwejan, 2020). This difference is likely due to the broader diet of the White-tailed Eagle and its preference to breed close to water where fish is usually the favoured prey during summer months when breeding pairs are rearing chicks and demand for food is highest (Anderwald et al 2013, Nadjafzadeh et al 2015). Furthermore, there was no evidence that the immature male White-tailed Eagle from the Isle of Wight, G393, predated any free-range poultry during its five month stay in West Norfolk. If a breeding population of White-tailed Eagles becomes established in eastern England, then breeding pairs are likely to settle close to the coast, and areas of inland water, such as the Norfolk and Suffolk Broads, where natural prey availability is high.

Disturbance of free-range poultry flocks is also highly unlikely, given the White-tailed Eagles' preference to utilise the sit-and-wait method for hunting with birds spending 93% of diurnal time perched (Nadjafzadeh et al. 2016). This was also exemplified by the behaviour of G393 in Norfolk. Analysis of satellite tracking data showed that the bird was perched during 91.6% of 21,404 diurnal GPS fixes logged for the bird between August and December, preferring to perch inconspicuously on the edge of woodlands and sometimes on mudflats in the Wash. This contrasts significantly to other raptors such as Buzzards and Red Kites which tend to spend more prolonged periods on the wing each day, and often perch in more prominent locations (Walls and Kenward 2020). During the public consultation, the British Free Range Egg Producer's Association (BFREPA) stated disturbance from other raptors such as Buzzards and Red Kites was very rare, occasionally taking place when multiple birds were on the wing and in proximity to outdoor poultry units.

Although we consider the risks to be low, we do acknowledge the concerns that have been raised during the consultation and are committed to working with free-range poultry farmers to monitor the movements of the released birds if the project goes ahead. One suggestion, made during an online webinar with the NFU, was that the project might consider working with poultry farmers to monitor any White-tailed Eagle disturbance issues that may arise, through a combination of satellite tracking data and field observations. We are fully committed to undertaking any such work, and this is included in the project's monitoring and evaluation plan (Appendix 3). We will also invite a representative of the free-range poultry industry onto the project's steering group.

4.2.4. Game shooting

Like in much of lowland England, game shooting is prevalent in the region and, as such, it is important to consider any potential impacts. The White-tailed Eagle is not an agile hunter, and therefore not predisposed to catch gamebirds, particularly in areas with extensive cover. Any gamebirds that might be eaten would be scavenged carcases that are found dead out in the open or robbed from other scavengers. This has proved to the be the case of the Isle of Wight where scavenged pheasants and partridges have been an important element of the diet of first winter birds in particular. This is also the case in the Czech Republic (Belka and Horal 2009).

It is clear from the in-depth monitoring work undertaken on the Isle of Wight that scavenged game birds become less important as individual eagles become older and more skilled at catching live prey. This is best exemplified by the behaviour of immature male G274 which has remained on the Isle of Wight almost continuously since release in August 2019. Analysis revealed that during its first winter G274 spent 75% of days between 1st November and 10th February in inland areas on the Isle of Wight, favouring sites where game bird carcasses, as well as sick or injured individuals, were readily encountered. It visited coastal areas on the remaining days, particularly Newtown NNR. In the corresponding period during the winter of 2020/21 the bird's habits changed dramatically (Table 6, Figure 22). It visited the coast on 55% of days and was observed catching European Bass off the southern coast of

the Isle of Wight throughout December. It was also observed taking fish discards from the back of a fishing boat during early February, and began predating freshwater fish at [redacted] from late January. This clear shift demonstrates the White-tailed Eagle's preference for taking fish whenever they are available, and a reduced dependence on game bird carcasses as early as their second winter. The bird was also observed catching Coot at [redacted] and hunting gulls at [redacted]. A similar change in behaviour was noted for another 2019 bird, female G324, although satellite data was of a lower temporal resolution.

While scavenged gamebirds are an important source of food for some juvenile White-tailed Eagles during their first winter, it is notable that there is no evidence that gamebirds constitute a key part of the diet of White-tailed Eagles during the breeding season. In western Scotland gamebirds were found to constitute just 0.4% of White-tailed Eagle diet (compared to 7.6% for Golden Eagles) (Whitfield et al. 2013). Meanwhile in more natural habitats for pheasants, in and near reed beds in the Danube Delta, Pheasants made up less than 5% of the diet of breeding White-tailed Eagles, and this was most likely to include birds killed on roads and taken as carrion. Overall, Pheasants constituted just 0.42% of the total biomass consumed by White-tailed Eagles (Sándor et al. 2015).

Table 6. Proportion of time spent in coastal and inland locations on the Isle of Wight by immature male G274 during winter 2019/20 and 2020/21.

Site	Number of days present (total 101 days)	
	2019/20	**2020/21**
Newtown NNR	21	30
South and west coasts of IoW	4	32
Brading Marsh		5
Total coastal	**25**	**56**
Inland only	**76**	**45**

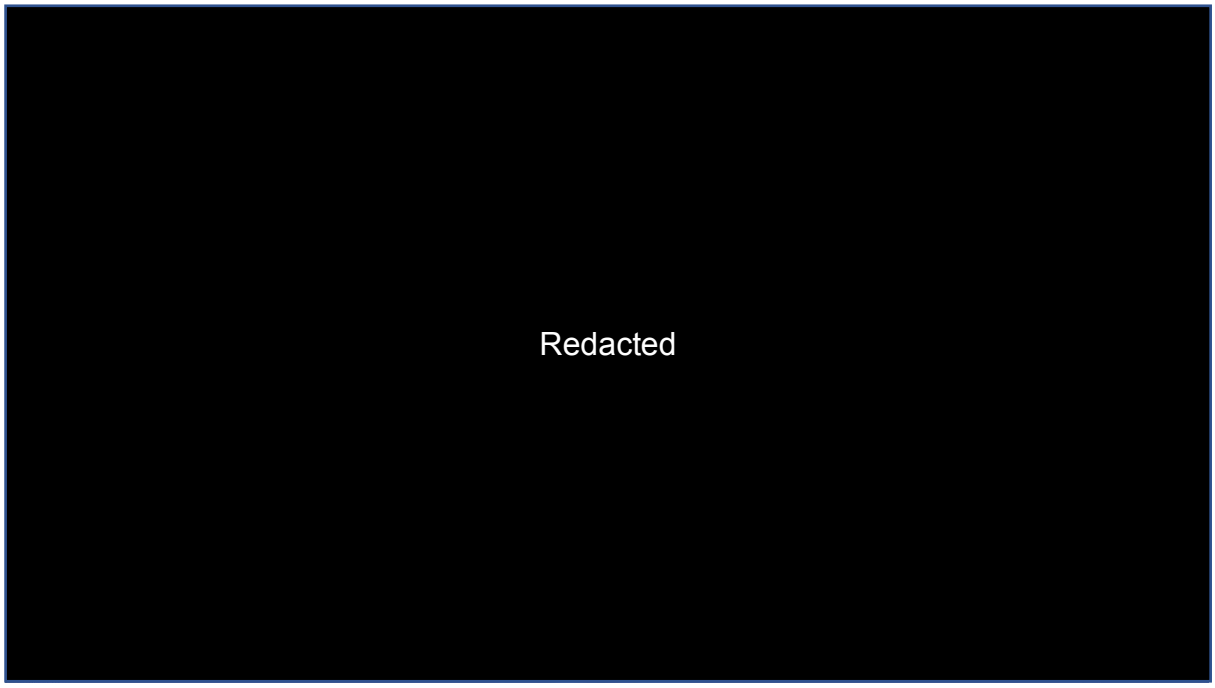


Figure 22. Comparison of G274's movements on Isle of Wight in winter 2019/20 (white) and winter 2020/21 (yellow) showing an increasing use of coastal sites during the second winter.

Pheasant and partridge shooting is widespread in West Norfolk and the wider region, and it is likely that some juvenile birds will favour areas with shoots during their first winter, as observed on the Isle of Wight. It will therefore be important to liaise closely with landmanagers with sporting interests where White-tailed Eagles settle. This approach has been used successfully on the Isle of Wight, and the project has received helpful support from gamekeepers as well as the Game and Wildlife Conservation Trust (GWCT). There is no evidence that the presence of White-tailed Eagles has had a detrimental impact on any game shoots on the Isle of Wight or elsewhere, and Mike Short, predator ecologist at GWCT and a member of the project's steering group, wrote a blog in December 2020, describing the positive relationship that has developed between the project and game shoots on the Isle of Wight. One of the key elements of this is that when White-tailed Eagles are present shooting estates, the location of the birds is not made public to avoid disturbance to the birds themselves and game shooting activities. This approach has been welcomed by shoots, and will be replicated in eastern England should the project receive a licence. Furthermore, should any issues be reported to the project, they will be investigated with the utmost urgency.

As a breeding population develops there is the possibility that White-tailed Eagles may settle to breed in woodlands with game shoots. While shooting activities do not take place during the breeding season, it may be that nests are built near pheasant pens. If this was the case the project team would work closely with gamekeepers and other land managers to determine the best course of action in order to prevent disturbance to breeding birds, while minimising any disruption to present land use and activities. The project team will also undertake a programme of artificial nest building to encourage young White-tailed Eagles to set-up territories in the most suitable areas as previously described (section 2.4.2).

As with the Isle of Wight project, a representative of the game shooting industry will be invited onto the project's steering group.

4.3.5. Fishing interests

Evidence from the Isle of Wight, and other White-tailed Eagle populations across Europe indicates that fish is likely to constitute a key part of White-tailed Eagle diet throughout the year, and, as such, it is essential to consider potential impacts on any fishing interests.

White-tailed Eagles readily take both marine and freshwater fish, targeting individuals that are close to the surface and relatively slow moving. It is for this reason that species such as Grey Mullet, which can be seasonally abundant in shallow water in estuaries, as observed on the Isle of Wight, are favoured prey.

Like on the South Coast, it is likely that Grey Mullet will be a key prey item of White-tailed Eagles around the East Anglian coast. Although mullet are edible they are not popular as a food fish in Britain and as a result commercial vessels do not generally target mullet in UK waters. The project team contacted the Eastern branch of the Association of Inshore Fisheries and Conservation Authorities (IFCA) who thought that the reintroduction of White-tailed eagles to the West Norfolk area was unlikely to give rise to serious issues for their members, largely due to the fact that commercial

fishing activity in the Wash and along the North Norfolk and South Lincolnshire coasts is focused on shellfish.

There is potential for some marine fishermen to benefit from the proposed reintroduction. In Scotland fishing boats take wildlife enthusiasts and photographers out to view White-tailed Eagles that have learnt to take fish thrown from boats (e.g. http://www.mullcharters.com/sea-eagles-mull.html). There is already evidence of birds on the Isle of Wight behaving similarly, and so if the Ken Hill project is granted a licence, the same may be possible in future years around the eastern England coast. The project will make every effort to support any such ventures.

White-tailed Eagles also take freshwater species, and often breed around large inland lakes in continental Europe. In the Netherlands, for example where fish constitutes 28% of the diet, carp and bream are most commonly caught (83%) with range of others also taken, including Pike, Zander and Perch (van Rijn and Dekker 2016). It is important to consider, however, that in these areas the estuarine species likely to be favoured on the south coast of England, are not present. Furthermore, carp and bream (generally ranging from 35-70 cm) are usually only taken when they are spawning and therefore close to the surface. Research has shown that fish are caught no deeper than 0.5 m below the water's surface (Ekblad et 2016) indicating that in coastal areas of eastern England estuarine fish are likely to be preferred because they are easier to catch at low tide.

As a population becomes established it is likely that White-tailed Eagles will breed close to areas of freshwater, most notably the Norfolk and Suffolk Broads. This area supports a range of species favoured by White-tailed Eagles in Europe. Coarse fishing is permitted in the Broads between 16th June and 14th March and White-tailed Eagles are likely to take some species targeted by anglers, including carp, bream, Northern Pike and Roach. It is highly unlikely, however, that White-tailed Eagles will have any detrimental impact on coarse fishing interests given the relatively small number of breeding pairs that are likely to become established in the short to medium term, and the varied diet of the species. White-tailed Eagles, by their nature, tend to favour the most seasonally-abundant prey, and as such will switch between different fish species according to local availability and also take other prey, such as

waterbirds and lagomorphs. In addition, White-tailed Eagles are only likely to hunt over relatively large expanses of open water, thus negating any impacts on river fish or those in small commercial lakes, particularly if they are enclosed by trees, close to farm buildings and/or there are anglers present. For example, immature male G393 spent prolonged periods at [redacted] in West Norfolk on 10 days between [redacted], but never the adjacent [redacted]. Like in most parts of lowland England, there are various coarse trout and coarse fishing lakes of this sort scattered through eastern England but we consider it highly unlikely that they will be visited by White-tailed Eagles and if they do, it is only likely to be on a very sporadic basis.

It is also important to recognise that there is a potential benefit of the project to anglers. White-tailed Eagles are known to predate juvenile Cormorants in various parts of their European range, including the Netherlands (Ekblad et al 2016, D van Straalen pers. comm. 2020) and it is possible that, in time, this may also be the case in eastern England. Cormorant is a species far more likely to result in conflict with anglers, but in the absence of White-tailed Eagles it has no natural avian predators in the region. It is significant that there has been no conflict with freshwater fishing interests anywhere in Scotland, despite the fact here are now at least 140 breeding pairs of White-tailed Eagles (D. Sexton pers comm 2020).

Although we do not expect any conflict with fisheries, it will be important to continue to liaise closely with all fishing interests if the project is given permission to proceed. Representatives from the marine and freshwater angling community will be invited onto the project steering group to ensure that their views are considered at all times. This offer was extended to both the Southern IFCA and Angling Trust at the time of the Isle of Wight project, but they did not consider it necessary. Instead, they are both corresponding organisations, who receive minutes from steering group minutes.

It should also be noted that the project team has extensive experience of dealing with fishing stakeholders given our ongoing work with Ospreys in both Scotland and England. In Rutland, Tim Mackrill worked with the owners of a trout farm who were losing significant numbers of fish to Ospreys, Cormorants, Grey Herons and Otters.

Following extensive discussions, the owner, with the help of the Rutland Osprey Project, built a photography hide on site and now charges photographers £75 per session to view the fishing Ospreys. With the hide able to accommodate up to six people concurrently, this has become a profitable venture and a key component of the business; off-setting all losses to predation and other factors, and reducing the number of fish that the trout farm needs to sell. This kind of partnership led approach will be essential to the long-term success of the White-tailed Eagle project.

4.3.6. Forestry and Woodland Management

The forests and woodlands of Norfolk and the wider region make an important contribution to the rural economy and range in size from small farm woodlands under two hectares to large public forests, the most notable being Thetford Forest which extends to 18,730 hectares (Forestry England 2021). The economic benefits provided by forestry and woodland management and the wider use of wooded habitats are diverse ranging from commercial timber harvesting to leisure-based pursuits and social enterprise. The very presence of woodland in the landscape creates a desirable environment with corresponding impacts on property values. Many woodlands are also integral to the game shooting industry, as previously discussed.

The project team are confident that the return of the White-tailed Eagle to the region will have a negligible to insignificant negative effect on the forestry and woodland management sector. This relates to the relatively large size of White-tailed Eagle territories and its proven ability to cope with disturbance associated with mechanised forest management and recreational use as observed elsewhere across its current range. However, the return of this protected species to forests and woodlands where landowners and managers have no experience of managing in their presence will necessitate the development of guidance material to help inform forest management practice.

In the interim the project field team will provide advice and support to the forestry sector and other woodland stakeholders, alongside that which is extended to the farming community and other key stakeholders. This will be particularly important as

breeding White-tailed Eagles begin to become established in the landscape. Nests are likely to be built in woodlands with tall mature trees and the project team will work closely with all key stakeholders to ensure that any landowners with nest sites receive the necessary support to ensure that the birds are not disturbed at key points in the breeding season, and that present land-use is disrupted as little as possible and that timber harvesting can continue, while recognising the White-tailed Eagle's status as a Schedule 1 species under the Wildlife and Countryside Act 1981.

4.3.7. Reporting Procedure

In view of concerns raised during the public consultation, and in keeping with the approach taken on the Isle of Wight, a reporting procedure for farming, shooting and fishing interests has been devised. This provides clarity on the way that any reports of problems will be dealt with by the project team in conjunction with Natural England and the project's steering group and monitoring and evaluation group, and the mechanisms by which subsequent action would be taken. Measuring the effectiveness of any mitigation implemented by the project is a key element of the project's monitoring and evaluation plan (Appendix 3). This reporting procedure is outlined in Appendix 5.

4.3.8. Project team responsibilities during Phase 2 of the reintroduction

The project team aims to complete the proposed release of up to 60 birds by the end of Year 5 of a proposed ten-year licence period, although it may be necessary to release birds in subsequent years if it is not possible to release the full complement of 60 birds in the initial five-year period (Section 6.14.1). Acknowledging the concerns of some stakeholders, the project team intends to continue selected responsibilities for a second five-year period – or Phase 2 – to mitigate for these concerns.

The project team expects that the evidenced behaviour of any released birds during the first five years of the project will significantly reduce the concerns of stakeholders, as has happened with the White-tailed Eagle reintroduction project in

Ireland, and is taking place on the Isle of Wight. In addition, as the size of a White-tailed Eagle population gradually grows, certain responsibilities of the project team during Years 1 to 5 of the project will not be practical during Years 6 to 10. As such, the project team propose to hold the following formal responsibilities only during Phase 2 of the reintroduction project:

1. to continue to provide a direct contact for concerned land managers;
2. to continue monitoring both breeding attempts and juveniles;
3. to continue running the steering group and monitoring and evaluation group under the terms of reference provided;
4. to continue providing annual reports to NE plus reporting any conflicts to NE as soon as they occur.

Point 1 would include continuing to provide available contact details for concerned land managers, and a commitment to responding where these concerns were corroborated by the satellite-evidenced presence of the birds or other information. Point 1 would also include continuing to advise on mitigation measures and, if required, any trapping or practical assistance with mitigation measures. Point 1 would not include proactive communication with landmanagers where birds were visiting, unless the birds were breeding, roosting in the same area for a significant amount of time, or if the sites were particularly sensitive, e.g. around an outdoor poultry site or significant nature reserve.

The project's Exit Strategy (Section 6.11) would be limited to the first five years of the project. After that it would remain possible for individual birds to be captured if they were causing serious damage (as outlined in Appendix 5 and in accordance with the Wildlife and Countryside Act), but an entire project exit would not be considered.

4.3.9. Conclusion

It is inevitable and understandable in a landscape where White-tailed Eagles and other apex predators have been absent for several centuries that any proposed reintroduction is met by concerns within the livestock, poultry, shooting and fishing

sectors. Nevertheless, it is important to consider that the project has also received significant support from members of these communities, and that any divisions are often amplified by media portrayal and by the very fact that those who oppose any such projects tend to be more vocal in their response than those who are ambivalent or supportive.

Whilst we do recognise the concerns that were raised during the public consultation, it is important to recognise that the White-tailed Eagle is a species that coexists very well with humans in highly anthropogenic landscapes in other parts of western Europe, most notably in Germany, the Netherlands and Denmark. In these countries there is no conflict with livestock, poultry, shooting or fishing interests and the birds are seen as very much part of the landscape. This evidence, coupled with early findings from the Isle of Wight project is extremely important. It shows that preconceptions about a species like the White-tailed Eagle are often based on misinformation, rather than evidence. Conflict with sheep farming in western Scotland has arisen because of differing farming practices and the fact that natural prey availability is poor compared with southern parts of the UK. In areas such as eastern England with very high natural prey availability the likelihood of conflict with any kind of livestock or poultry farming is low, as exemplified by evidence from Europe and the Isle of Wight. We do, nevertheless, recognise that concerns have been expressed and the project team is committed to working closely with all key stakeholders. We have devised a robust monitoring and evaluation plan for the project (Appendix 3), and have a reporting strategy for livestock, poultry, shooting and fishing interests should any concerns arise. Representatives from all key groups will also be invited to join the project's steering group. This, we hope, will help to reassure those with concerns that they have been listened to. The project has also devised an exit strategy as is recommended for all reintroduction projects through the IUCN guidelines.

We believe that in the long run the White-tailed Eagle will enrich the wetland and coastal ecosystems of eastern England and that the birds will coexist with livestock, shooting and fishing interests as observed elsewhere in Europe. This would be a mark of success for the project.

5. Stakeholder and public consultation

5.1. Introduction

The project team performed an extensive stakeholder consultation that directly solicited views on the proposals from 36 landowners and land managers and 28 organisations and membership bodies in one-to-one discussions, as well as collecting views of the general public and relevant interests in the area through an online survey (1,839 respondents), and hosting a series of online webinars (total of 183 registrants). Where any of the above organisations desired, the project team also held follow-up webinars for members of these organisations. At the time of writing, four such webinars were held, including for the National Farmers' Union (NFU) and National Pig Association (NPA), the National Sheep Association (NSA), and the Country Land and Business Association (CLA) members.

Overall, the response to the proposals during the public consultation was overwhelmingly positive. Amongst 1,839 respondents to the online survey, 91% responded in support of the proposals, including 83% that responded as "strongly supportive". In the same survey, every major stakeholder group responded in favour of the proposals, including amongst participants in farming (63%), shooting and wildfowling (62%), conservation (86%), fishing (77%), birdwatching (90%), and tourism (87%). In addition, 15 landowners and land managers managing tens of thousands of acres have provided formal support for the proposals, including those engaged in outdoor pig farming, sheep farming, shooting and wildfowling. A number of others were also informally supportive. Five conservation organisations also provided formal support for the proposals: the Royal Society for the Protection of Birds (RSPB), the National Trust, Forestry England, the Wash Wader Ringing Group (WWRG), and Rewilding Britain.

The following section seeks to outline the results of the public consultation in further detail and in an objective manner, such that the feasibility of the proposals can be fairly assessed. Although the overall response to the proposals was overwhelmingly positive, the following section discusses in greater detail concerns raised by stakeholders. This recognises that airing of these concerns alongside key mitigating factors is likely of more value to those reviewing this document, and also to the

project team's continued efforts to build broad-based support for the proposals. For reference, the Norfolk Wildlife Trust (NWT) and the Game & Wildlife Conservation Trust (GWCT), and the British Free Range Egg Producers Association (BFREPA) requested to read the feasibility study before providing formal responses, and the engagement process was still ongoing with the British Association for Shooting and Conservation (BASC) at the time of writing. The North Norfolk Area of Outstanding Natural Beauty (AONB) did not respond to a request for engagement.

5.2. Methodology

The stakeholder consultation was principally focused around the expected natal dispersal range around Ken Hill, which was assumed to be 50 km. However, recognising that juvenile birds released on the Isle of Wight have dispersed quite widely, the consultation also considered responses where appropriate at a regional and even national scope. The stakeholder consultation began in September 2020, lasting for six months. Table 7 and Table 8 summarise key activities undertaken. The stakeholder consultation took place during the Covid-19 pandemic and associated restrictions. As a result, typical consultation events for the general public such as drop-ins, street surveys, and town halls were unavailable to the project team. These were replaced by a series of online webinars, and an online survey. A number of the one-to-one discussions took place online, not in person.

A significant volume of information was also published for public consumption on Ken Hill's website, and pushed out through its social media channels (total following of ~6,000). The project team also engaged proactively with the press to encourage uptake of the materials and online survey. The launch of the public consultation was distributed to five local papers (e.g., Eastern Daily Press, Your Local Paper) and covered by national papers (e.g., Guardian, Independent, Daily Mail, Telegraph), and a project team member spoke to BBC Radio Norfolk on live radio. At least five stakeholders also distributed consultation information and survey to their members and associates, including the CLA and the NFU. The project team were therefore confident that despite the pandemic, they were able to reach and solicit views from a significant and relevant sample of people.

Table 7. Summary of one-to-one engagements held by the project team with individual landowners and land managers.

Stakeholder name	Interests represented							Geographical spread			
	Conserv-ation	Tourism	Game & wildfowl	Arable farming	Livestock farming	Poultry farming	Fishing / fisheries	Norfolk	Lincs	Suffolk	Cambs
Individual Landowners & landmanagers (total = 36)											
Aubourn Farms			✓	✓					✓		
Burnham Thorpe			✓					✓			
Carbooke Farms			✓	✓	✓			✓			
Deepdale Farm	✓	✓		✓				✓			
Deepdale Marsh	✓							✓			
Dersingham Farms				✓	✓			✓			
Doddington Hall	✓	✓	✓	✓					✓		
Fring Estate		✓		✓				✓			
King's Lynn Angling Association							✓	✓			
Glovers Farm				✓	✓			✓			
Great Glemham	✓			✓						✓	
Heacham Wildfowlers			✓					✓			
Hoe Hall	✓		✓	✓	✓			✓			
Holkham Estate	✓	✓	✓	✓	✓			✓			
Houghton Estate	✓	✓	✓	✓	✓	✓		✓			
Gayton Road & Nar Valley Fisheries							✓	✓			
Maple Farms	✓	✓		✓	✓	✓				✓	
Massingham Farms	✓			✓	✓			✓			
Morton's Family Farm						✓		✓			
Narborough Fisheries							✓	✓			
North Farm Livestock					✓			✓			
Pensthorpe	✓	✓		✓				✓			
Ranworth Farms	✓	✓		✓				✓			
Sandringham	✓	✓	✓	✓	✓			✓			
Scrivelsby Estate	✓		✓	✓					✓		
Somerleyton Estate	✓	✓	✓	✓	✓			✓		✓	
Stanhoe Farms	✓			✓	✓			✓			
Stody Estate	✓		✓	✓				✓			
Summerfield Farms				✓	✓			✓			
Tittleshall Farms		✓		✓				✓			
Traditional Norfolk Poultry						✓		✓			
Upper Deben Farms				✓						✓	
Waren Farm	✓		✓	✓	✓			✓			
Watlington Farms	✓	✓		✓				✓			
West Acre Estate	✓	✓	✓	✓	✓			✓			
Wind Pump Farms				✓					✓		

Table 8. Summary of one-to-one engagements held by the project team with organisations, membership bodies, and others.

Stakeholder name	Interests represented							Geographical spread			
	Conserv-ation	Tourism	Game & wildfowl	Arable farming	Livestock farming	Poultry farming	Fishing / fisheries	Norfolk	Lincs	Suffolk	Cambs
Organisations and membership bodies (total = 28)											
North Norfolk AONB		✓						✓			
BASC	✓		✓					✓	✓	✓	✓
BFREPA						✓		✓	✓	✓	✓
British Trust for Ornithology (BTO)	✓							✓	✓	✓	✓
CLA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Forestry Commission	✓							✓	✓	✓	✓
Forestry England	✓							✓	✓	✓	✓
GWCT	✓		✓					✓	✓	✓	✓
Heacham Parish Council	n/a – other interest							✓			
Inshore Fisheries and Conservation Authorities (IFCA)							✓	✓	✓	✓	
Lincolnshire Wildlife Trust	✓	✓							✓		
NFU				✓	✓	✓	✓	✓	✓	✓	✓
NPA					✓			✓	✓	✓	✓
NSA					✓			✓	✓	✓	✓
Norfolk Farming and Wildlife Group	✓			✓	✓	✓		✓			
Norfolk Rivers Trust	✓						✓	✓			
NWT	✓	✓						✓			
Rewilding Britain	✓	✓			✓			✓	✓	✓	✓
RSPB	✓	✓		✓	✓			✓	✓		
Snettisham Parish Council	n/a – other interest							✓			
Suffolk Wildlife Trust	✓	✓								✓	
The Broads Authority	✓	✓						✓			
The National Trust	✓	✓						✓			
The Wash & North Norfolk Marine Partnership	✓	✓						✓	✓		
UEA	✓							✓			
Visit West Norfolk	✓										
WWRG	✓							✓	✓		
Wildlife Trust for Beds, Cambs, and Northants	✓	✓									✓
Other (total = 2)											
James Wild MP	✓	✓	✓	✓	✓	✓	✓	✓			
Light Aircraft Company	n/a – other interest							✓			

5.3. Results

5.3.1. Introduction

The results from the public consultation process are provided in detail in the following pages. These results are structured and discussed by major stakeholder group, along with key mitigating factors where concerns were raised.

5.3.2. Conservation

Overall, the reaction of landowners, land managers, organisations, and members of the general public engaged in nature conservation activities was supportive of the proposals. A number of landowners and land managers engaged in conservation provided formal and informal support for the proposals as well as several key conservation organisations, including the RSPB, the National Trust, the Wash Wader Ringing Group, Forestry England, and Rewilding Britain. 86% of 816 survey respondents indicating participation in the conservation sector also indicated support for the proposals. Common motivation for positive sentiment among these stakeholders was the return of a native bird to its former range, along with an assessment that the risk to the rare assemblage of species in West Norfolk and the surrounding region from White-tailed Eagles was very low.

Where concerns did arise, they mostly related to the potential impact of White-tailed Eagles upon particular species of existing conservation concern in the region. For example, the Holkham NNR Advisory Board wanted to understand better the potential impact to Spoonbill, Cattle Egret, and similar birds. A webinar was organised by the project team to address the concerns directly, citing mitigating factors such as the bird's preference for the most seasonally abundant prey, as well as summarising evidence from other White-tailed Eagle populations that co-exist with such species. Further detailed information on this particular risk is provided in section 3.2.

Similarly, some Broadland landowners and the Broads Authority raised concerns around the potential impact to Common Cranes. Summary findings from the impact assessment performed for Natural England's proposals 10-15 years ago, which suggested the risk of predation was highly unlikely, were summarised (but not

shared directly) to allay concerns and the project team also committed to including relevant information on the predation risk in the ecological impact section of the feasibility study (see section 3.9).

Other species mentioned as of potential concern included Grey Partridge, Brown Hare, Curlew, and Pink-footed Goose, where typically reference to the regular diet of White-tailed Eagles and their preference for the most seasonally abundant prey reduced concerns. The risk to songbirds was raised but retracted upon better understanding of the White-tailed Eagle diet.

Another specific area of concern raised among those engaged in conservation was around the impact of disturbance on wetland birds. Evidence from the Isle of Wight reintroduction project (including photographic evidence) and from across Europe was helpful in allowing the project team to show stakeholders engaged in nature conservation that this is unlikely to be a significant issue.

5.3.3. Tourism

Overall, the reaction of landowners, land managers, organisations, and members of the general public engaged in nature conservation activities was supportive towards the proposals. A number of landowners and land managers engaged in tourism provided formal and informal support for the proposals, and 87% of 269 survey respondents indicating participation in the tourism sector also indicated support for the proposals. Key motivation for support was the likely uptick in the value that tourism provides to the local economy, particularly given the national agenda for a green recovery from the Covid-19 induced recession, and that the year-round presence of White-tailed Eagles may help to boost tourism in the off-season, mitigating the problem of seasonality for many local consumer-facing businesses. The local tourism board also identified that the proposals were consistent with its wider “sustainable tourism” agenda.

Among landowners and land managers, where concerns did arise, they related to the potential impact of birdwatchers attempting to see White-tailed Eagles on private sites. The project team was aware this would likely be a concern and were able to

provide information around mitigating factors. In particular, the project team highlighted that the live location of birds when they are at private or sensitive sites will not be publicised by the project team, during the five-year release phase or thereafter. It was also highlighted that the aim of the project team is to support White-tailed Eagle viewing opportunities at sites with good public access and visitor facilities, whether these be at Ken Hill or elsewhere. The project team stated that this was likely to draw interested birdwatchers and others towards these sites, dissuading them from attempting to visit private sites. The project's Visitor Management Strategy is included in Appendix 4.

Some landowners and land managers voiced concern that the Norfolk coast would suffer from any additional tourism, and this view was also identified in some survey responses. Conversely, The Visit West Norfolk tourism board suggested that the proposals tied in well to its 'sustainable tourism' agenda, and could help to re-balance tourism flows away from the North Norfolk coast towards West Norfolk. The project team itself suggested that the incremental amount of new tourism to the area was not likely to be particularly large, unlike the Isle of Mull or the Isle of Wight, because of the extent of existing tourism and bird watching activity, although this would be difficult to measure.

Conservation organisations with tourism-facing activities, including the RSPB and Norfolk Wildlife Trust, requested assurance that the project team would be able to provide them with relevant information around the project to assist with their visitor management activities. The project team committed to liaising heavily with such organisations, both through the public consultation process where members of the public would look to such organisations for advice, and during the project, where confidentially alerting such organisations to the presence of particular birds would help them to manage visitors effectively.

5.3.4. Game and Wildfowl

Overall, the reaction of landowners, land managers, organisations, and members of the public engaged in shooting or wildfowling farming activities was positive towards the proposals. A number of landowners and land managers engaged in shooting or

wildfowling provided formal and informal support for the proposals, and 62% of 122 survey respondents indicating participation in shooting or wildfowling also indicated support for the proposals, with 51% being “strongly supportive”.

A concern that did arise during the consultation was direct predation of game birds by White-tailed Eagles. During an online webinar with the NFU, a farmer asked to respond on behalf of attendees by the Chair suggested this would have an economic impact on commercial shooting. The project team were able to describe that the risk to game birds was extremely low, as the White-tailed Eagle is not an agile hunter, and also provide a variety of evidence from other White-tailed Eagle populations detailing the very low percentage of the bird’s diet made up by game birds.

The other concern that did arise was the potential impact of disturbance to both game birds and wildfowl, particularly during breeding. The project team suggested that the small number of White-tailed Eagles being released, the low proportion of time spent flying, the high availability of natural prey, and the emerging evidence from the southern England reintroduction indicated that the disturbance risk was very low.

In addition to the above, the project team also held a meeting for gamekeepers employed at major shooting estates in Norfolk, and also informally consulted with a number of other local keepers. In general, there was an initial sense that the presence of another bird of prey in the ecosystem would be unhelpful for shooting interests, but the gravity of this concern was dampened upon understanding that White-tailed Eagles may predate Common Buzzards as evidenced in Lithuania, and that keepers on the Isle of Wight have enjoyed seeing them and not found them problematic.

5.3.5. Farming

Overall, the reaction of landowners, land managers, organisations, and members of the public engaged in farming activities was positive towards the proposals. A number of landowners and land managers engaged in livestock farming provided

formal and informal support for the proposals, and 63% of 216 survey respondents indicating participation in the farming sector also indicated support for the proposals, with 57% being “strongly supportive”.

In addition to the number of landowners and land managers participating in farming that were directly consulted by the project team, liaison with the NFU was also undertaken to expand the reach of the consultation. In particular, the project team offered to hold a webinar for members of NFU branches. The NFU representative advised that this invitation was distributed to around 600 individual farmers, and the webinar itself was attended by around 45 individuals. The NFU also distributed information provided by the project team and an invitation to take an online survey through its regional newsletter.

The project team offered to hold a similar webinar for NPA members, but the NPA representative pointed out that around 90% of its regional NPA members were also members of the NFU, and was happy that these members would be appropriately canvased by the project team’s webinar for NFU members. An online webinar was also held for regional members of the NSA, which five members attended, and for the CLA, which ten members attended.

The following is structured into the three major types of farming being performed by stakeholders: arable, livestock and poultry. Within livestock farming, pig and sheep farming are focused on, as the potential impact to cattle farming is negligible to none. Although arable farming was the most common type of farming being performed by stakeholders – reflective of the farming landscape in west Norfolk and the surrounding region – more of the below focuses on livestock and poultry farming where the views of stakeholders were more complex.

5.3.5.1. Arable farming

Overall, the reaction of landowners, land managers, organisations, and members of the general public engaged in arable farming activities was positive towards the proposals. The opportunity to see the bird, be involved in project activities such as nest monitoring, and to showcase the work performed by land managers in

conservation and stewardship of the countryside were highlighted as key motivating factors this support. The view that farming practices needed to change to hold a higher focus on environmental land management in response to ongoing biodiversity decline in the UK and climate change was also shared.

The impact of White-tailed Eagles on arable farming activities, which make up the majority of farming in Norfolk and the surrounding region, was generally considered to be negligible. The main concern raised by those participating in arable farming was around unauthorised access by birdwatchers, which is described and addressed above.

5.3.5.2. Livestock farming

Overall, the reaction of landowners, land managers, organisations, and members of the general public engaged in livestock farming activities was mixed to positive towards the proposals. A number of landowners and land managers engaged in livestock farming provided formal and informal support for the proposals. This included outdoor pig producers, including one of Norfolk's leading producers, as well as those involved in sheep farming, including an adjacent farm to Ken Hill with 1,000-2,000 sheep, depending on the season. Motivating factors among livestock farmers supportive of the proposals were similar to those participating in arable farming. In addition, the risk presented to outdoor pig farming and outdoor lambing was assessed as very low among this group, and the mitigation protocols and exit strategy presented by the project team was considered to be practical and reassuring. The initial evidence from the southern England reintroduction project – where no instances of conflict have been recorded with any type of farming system – was considered to be very helpful in reaching these conclusions.

Conversely, other participants in livestock farming raised some concerns. The principal concern was the risk of direct predation of young lambs and piglets at outdoor units. Examples from Scotland where there are some recorded instances of conflict between White-tailed Eagles and hill lambing were often raised as underpinning these concerns. Here, the project team, of which members have been deeply involved in the expansion of the Scottish White-tailed Eagle population, suggested that there were large differences in ecosystems between Scotland and

West Norfolk and the surrounding region. The project team suggested that other lowland White-tailed Eagle populations, such as the Netherlands, and southern England, offered better comparators, as ecosystems were more similar, and in particular the availability of natural prey was much higher than in Scotland.

A second key concern raised by participants in livestock farming was around the potential impact of disturbance to livestock productivity, i.e. the potential impact of White-tailed Eagles flying overhead to behaviours of sows and ewes that could reduce the number of piglets and lambs produced by the farm. The project team suggested that the small number of White-tailed Eagles being released, the low proportion of time spent flying, the high availability of natural prey, and the evidence from other White-tailed Eagle populations that overlap with outdoor pig and sheep farming combined to indicate that the disturbance risk to productivity was very low or non existent. No evidence was provided by those raising these concerns from other White-tailed Eagle populations to suggest that the impact of disturbance on productivity had taken place elsewhere.

In both instances, evidence supplied to the project team by the southern England reintroduction project on the behaviour of a bird released in 2019 – G393, which spent several weeks around outdoor pig units at [redacted] without instance of either direct predation or disturbance – was helpful in allaying some of these concerns. In addition, the project team offered to help conduct relevant research and monitoring activities on predation and disturbance if a bird was consistently present around outdoor pigs and lambs and the farmer was willing and able to support the activity.

Generally, livestock farmers also wanted to understand better mitigation tactics and the possibilities for compensation in the instance of negative impacts to production. The project team outlined its mitigation protocols and the array of mitigation tactics available, both with and without licence. Diversionary feeding and visual scaring were typically considered to be most practical. The project team also outlined under what circumstances a bird would be removed from the landscape, and also an exit from the wider reintroduction project. With regards to compensation, the project team offered information provided by Natural England, which stated that there are

currently no such compensation schemes but could be reviewed. Evidence over two years of the Isle of Wight project suggests this will not be needed.

5.3.5.3. Poultry farming

Overall, the reaction of landowners, land managers, organisations, and members of the general public engaged in poultry farming activities was mixed towards the proposals. Two large outdoor poultry producers in Norfolk – Traditional Norfolk Poultry and Morton's Family Farm – offered informal support for the proposals and a large free range egg producer in Suffolk – Maple Farms – wrote in support of the proposals, all three assessing that the risk to outdoor poultry farming was very low. Motivating factors among poultry farmers supportive of the proposals were similar to those participating in arable farming.

Conversely, the British Free Range Egg Producers Association (BFREPA) raised some concerns. During an initial direct consultation with BFREPA, the organisation raised concerns that White-tailed Eagles could either directly predate birds in outdoor laying units, or cause disturbance to birds in these units. While it was agreed by BFREPA and the project team that the likelihood and level of impact or predation was low, BFREPA suggested that the potential disturbance caused by White-tailed Eagles could cause high stress levels in flocks of outdoor birds, which can lead to instances of cannibalism within the flock and at times, entire loss of the flock.

The project team raised a number of mitigating factors. In particular, that the proposals would only see a small number of White-tailed Eagles released and eventually established in Norfolk and the surrounding region relative to the very significant number of meso-predators in the area which outdoor poultry units have developed alongside. The project team also highlighted that White-tailed Eagles spend the majority of their time perched (over 90% for G393 during the 5 months spend in Norfolk) and are therefore less likely to cause disturbance when flying overhead. In addition, the project team mentioned that the presence of humans working at the units would likely disturb and deter White-tailed Eagles from the area, and that the high abundance of natural prey items in Norfolk and the surrounding region would also serve to mitigate risk levels.

BFREPA stated that disturbance caused by other birds of prey such as Buzzards and Red Kites, as well as large gulls and corvids to outdoor poultry farming was very minor, only causing issues on rare occasions when large numbers of the predator bird was present. This suggested to the project team that the potential disturbance risk posed by White-tailed Eagles was also very low or non-existent, and the project team requested BFREPA to share any further data or information on this issue.

During the initial engagement, BFREPA also suggested that the disturbance risk caused by White-tailed Eagles would be more similar to that of military planes and helicopters, or hot air balloons with ignited burners, rather than other birds. The project team suggested that BFREPA collaborated with them on two areas to improve the shared understanding of the risk posed by White-tailed Eagles to outdoor poultry farming. The first was for BFREPA to provide spatial data on the locations of outdoor poultry units of their members such that the project team could identify occasions where birds from the Isle of Wight reintroduction project may have come within several hundred metres of the units. At the time of writing, the project team and BFREPA continue to work on this analysis and others to build their shared understanding of the risk to outdoor poultry farming.

The second was to collaborate on obtaining further evidence from White-tailed Eagle populations in Europe that exist in countries with meaningful levels of outdoor poultry farming. The information received by the project team from the Netherlands was that this had not been identified as an issue and no complaints had been received by Dutch biologists. A literature search of other nearby countries did not find any reported conflicts. BFREPA indicated that it would provide a formal response after having read the feasibility study.

5.3.5.4. Fishing / fisheries

Overall, the reaction of landowners, land managers, organisations, and members of the general public engaged in nature conservation activities was supportive towards the proposals. A number of landowners and land managers engaged in fishing or fisheries provided formal and informal support for the proposals, and 77% of 155

survey respondents indicating participation in fishing also indicated support for the proposals. Multiple stakeholders involved in freshwater fishing or fisheries voiced that species like Mink, Otter, Grey Heron and Cormorant posed greater threats to their fishery than that of White-tailed Eagles. Among those managing freshwater fisheries, many felt that there would be few or no interactions on their sites due to the structure and location of their sites and the presence of people.

Where concerns did arise, they mostly related to the potential impact of direct predation by White-tailed Eagles upon freshwater fish stocks. At freshwater fisheries, it was suggested that this could have an economic impact, although this was a minority view. The project team suggested that it was likely that the White-tailed Eagles would favour estuarine species and marine carrion, rather than visiting smaller inland fishing lakes, of which several identified were close to buildings and roads and would often have anglers present. The project team also provided information around the depths at which White-tailed Eagles are typically able to predate fish (0.5 metres or shallower), which allayed some of these concerns.

The project team also contacted the Eastern branch of the Association of Inshore Fisheries and Conservation Authorities (IFCA) who thought that the reintroduction of White-tailed eagles to the West Norfolk area was unlikely to give rise to serious issues for their members, largely due to the fact that commercial fishing activity in the Wash and along the North Norfolk and South Lincolnshire coasts is focused on shellfish.

5.3.5.5. Private airfields and flying

The project team held one formal engagement with an organisation involved in private flying, as well as other informal engagements with participants that preferred not to be included in the feasibility study. One concern raised was that the size of the White-tailed Eagle could make the impact of bird strike more damaging; equally, it was mentioned that the size of the bird could make them easier to see and therefore avoid.

The project team suggested that the incremental risk of bird strike posed by White-tailed Eagles was incredibly low relative to the number of existing birds in the area.

The project team subsequently analysed satellite data to show that G393 spent only 1.3% of its diurnal time above 500ft whilst in Norfolk, below which private planes cannot fly. The same bird spent 0.8% of its time above 750ft and 0.5% of its time above 1000ft, further helping to mitigate the risk.

5.3.5.6. Birdwatching

Towards the end of the public consultation, there was public debate among the Norfolk birdwatching community after the publication of a document by a member of the general public named Dave Appleton. The project team did not respond formally to this document, but had previously liaised with the author in the spirit of transparency to provide him with sources he had not previously read, including the Isle of Wight feasibility study and several academic papers. Although the publication of this document generated around 30-40 new online survey responses against the proposals at the time, 91% of 936 survey respondents indicating participation in birdwatching also indicated support for the proposals, the highest among any major stakeholder group, suggesting that the views of Dave Appleton are shared only in a very small minority.

5.3.5.7. General views

This section seeks to detail particular views that were shared across stakeholder groups.

As aforementioned, the response to the proposals during the public consultation was overwhelmingly positive. There were several motivating factors for this that were shared across major stakeholder groups. First, was the general desire to see nature recovery and a reversal of biodiversity loss in the UK, which the majority of stakeholders agreed the proposals were consistent with. Many stated that we should feel obliged to reverse the loss of native species and broader biodiversity caused by human activity.

Another was the opportunity to see and live alongside White-tailed Eagles was considered to be a highly compelling opportunity by residents. The bird and the

prospect of seeing it was described in various conversations and survey responses as “magnificent”, “spectacular”, “exciting”, and “wonderful”. Although the project team had not focused on the potential tourism benefit in its consultation materials (themselves believing that incremental tourism to the area is unlikely to be as significant as on Mull or the Isle of Wight), a large number of stakeholders and survey responses identified the benefit the proposals would bring to the local tourism and hospitality sectors, creating jobs and other opportunities. A number of survey respondents volunteered to assist with the project.

A number of stakeholders and survey respondents also identified the role that flagship species and apex predators can have in positively impacting ecosystems directly and indirectly. For example, the positive focus that reintroduction projects could bring on wider nature conservation was highlighted. A number of consultees considered the proposals as a natural extension to the “Wild Ken Hill” project taking place at the proposed release site, where a variety of new habitat enhancement and creation are taking place across 4,000 acres of land; these consultees identified the positive interrelationship between species reintroductions and habitat improvements that often take place together.

Another motivating factor among consultees responding positively to the public consultation, typically among conservation organisations and some landowners and land managers, was the role that headline-worthy projects such as these proposals can have among the wider general public, particularly those with limited familiarity or interest in nature conservation in the UK. These consultees suggested that bringing forward such proposals prompts important conversations among audiences often not reached by existing nature conservation efforts, potentially inspiring them about nature, the countryside, and farming, thereby adding to the overall support for and progress within nature conservation.

A small number of respondents to the consultation indicated they would like to work with the project team to expand the number of release sites, with several additional sites in Suffolk being mentioned.

Among the general concerns that were common to two or more major stakeholder groups, a principal concern was whether these proposals represented a priority for nature conservation in the area. The project team explained their position on this issue, suggesting that these proposals are by no means mutually exclusive with other important conservation work. The “Wild Ken Hill” project at the release site demonstrates this, where not only have two pairs of Eurasian Beavers been reintroduced, but a variety of new habitat enhancement and creation have taken place in the past three years, including raising water levels across 500 acres of freshwater marsh that was described as the most important piece of conservation work performed in Norfolk in 2019. The project team suggested that differing beliefs around the relative priority of different types of conservation work should not undermine projects that would address biodiversity decline and reinstate missing native species.

Linked to the above concern, a number of consultees raised that the White-tailed Eagle is categorised as a species of “least concern” by the IUCN. The project team responded that the species is Red-listed in the UK, that it occupies only a limited amount of its former range in western and southern Europe, and that reinstating a population to west Norfolk and the surrounding region would enable better connectivity among meta populations, thereby aiding the long-term sustainability of those populations.

A small number of land managers also questioned whether the proposed reintroduction of White-tailed Eagles was compatible with other visions for the region that might include the reintroduction of White Storks, as in 2020 at Knepp Castle Estate, or Great Bustards *Otis tarda*. The project team suggested that with the appropriate and necessary growth in habitat, that the region should be able to sustain balanced and fully-functioning ecosystems.

There were also concerns, typically among members of the public responding to the survey, that any White-tailed Eagles released would be persecuted. The project team suggested that it did not share these concerns given the huge change in socio-economic environment since the extinction of White-tailed Eagles in the UK, the bird’s protected status, and the deep ties held by Ken Hill with relevant interests in

the local area. There was also a curiosity in why the project team expect 35-40% of released juveniles to reach breeding age, which the project team explained was a mixture of biological and human-related factors.

One concern shared by multiple stakeholder groups was – although evidence might suggest predation of particular species may be low – whether there would be protocols in place for dealing with a released White-tailed Eagle that learnt to specialise on a specific and undesirable prey item. In this instance, the project team referenced the protocols for mitigation and ultimately removal of a bird from the landscape that might form part of its feasibility study.

A related concern was whether the licence required to remove a bird from the landscape would be made available to the project team or relevant land manager by Natural England in a timely and robust manner. The project team stated that such decisions were ultimately out of their control, but that they would liaise with relevant land managers to gather required evidence to improve chances of receiving such a licence. The project team also stated that they would be practical in encouraging Natural England to issue a licence in these instances, as the detrimental impact of a particular bird could undermine the overall success of the project, which clearly the project team are eager to ensure.

The majority of parties welcomed that the project team included a local and respected land manager, with approachable and qualified personnel and a nominated project officer to liaise with as the project progressed.

5.3.6. Survey results

Table 9 and Table 10 provide key results from the online survey, which 1,839 respondents took. The raw survey responses and accompanying analysis will be made available separately for review.

Table 9. Responses to demographic questions.

Age		
Q:	Which age bracket do you fall into?	
	# responses	*% responses*
17 years old or less	9	*0.5%*
18 to 30 years old	236	*12.8%*
31 to 40 years old	240	*13.1%*
41 to 50 years old	283	*15.4%*
51 to 60 years old	440	*23.9%*
61 to 70 years old	444	*24.1%*
71 years old or more	178	*9.7%*
Prefer not to say	9	*0.5%*
Total	**1,839**	

Gender		
Q:	Which gender do you identify with?	
Male	1,105	*60.1%*
Female	710	*38.6%*
Non-binary	6	*0.3%*
Other	0	*0.0%*
Prefer not to say	18	*1.0%*
Total	**1,839**	

Ethnicity		
Q:	Which of the following best describes your ethnic group?	
White	1,761	*95.8%*
Mixed or multiple ethnic groups	19	*1.0%*
Black, African, Black British or Caribbean	2	*0.1%*
Asian or Asian British	6	*0.3%*
Another ethnic group	3	*0.2%*
Prefer not to say	48	*2.6%*
Total	**1,839**	

Table 10. Responses to proposal questions.

Overall views		
Q:	How do you feel about the proposal to reintroduce white-tailed eagles?	
	# responses	*% responses*
Strongly supportive	1,533	*83.4%*
Supportive	133	*7.2%*
Neutral	34	*1.8%*
Against	53	*2.9%*
Strongly against	86	*4.7%*
Total	**1,839**	

Views by major interest group							
Q:	How do you feel about the proposal to reintroduce white-tailed eagles?						
Q:	Do you work or participate in any of the following sectors and interests? (Tick as many as apply)						
# responses	Conserv-ation	Tourism	Farming	Bird-watching	Shooting or wild-fowling	Fishing	None of the above
Strongly supportive	652	224	123	784	62	110	494
Supportive	52	10	14	63	14	9	44
Neutral	26	10	10	19	8	6	5
Against	35	12	22	33	9	8	4
Strongly against	51	13	47	37	29	22	7
Total	**816**	**269**	**216**	**936**	**122**	**155**	**554**
% responses (N.B. percentages may not add to 100.0% due to rounding)							
Strongly supportive	*79.9%*	*83.3%*	*56.9%*	*83.8%*	*50.8%*	*71.0%*	*89.2%*
Supportive	*6.4%*	*3.7%*	*6.5%*	*6.7%*	*11.5%*	*5.8%*	*7.9%*
Neutral	*3.2%*	*3.7%*	*4.6%*	*2.0%*	*6.6%*	*3.9%*	*0.9%*
Against	*4.3%*	*4.5%*	*10.2%*	*3.5%*	*7.4%*	*5.2%*	*0.7%*
Strongly against	*6.3%*	*4.8%*	*21.8%*	*4.0%*	*23.8%*	*14.2%*	*1.3%*

Views by key geography

Q:	How do you feel about the proposal to reintroduce white-tailed eagles?
Q:	In which of the following areas do you live?

# responses	Norfolk	Other relevant counties*	None of the above	**Total**
Strongly supportive	652	224	494	**1533**
Supportive	52	10	44	**133**
Neutral	26	10	5	**34**
Against	35	12	4	**53**
Strongly against	51	13	7	**86**
Total	**816**	**269**	**554**	**1839**
% responses (N.B. percentages may not add to 100.0% due to rounding)				
Strongly supportive	*79.4%*	*84.8%*	*89.3%*	*83.4%*
Supportive	*9.3%*	*5.3%*	*4.7%*	*7.2%*
Neutral	*2.6%*	*1.3%*	*0.9%*	*1.8%*
Against	*3.5%*	*3.0%*	*1.8%*	*2.9%*
Strongly against	*5.2%*	*5.6%*	*3.3%*	*4.7%*

** Suffolk, Lincolnshire, and Cambridgeshire*

Responses to question statements

Q:	To what extent do you agree with the following statements?

	1 - strong disagree	2	3	4 - neutral	5	6	7 - strongly agree	**Total**
It would be good to see this native bird back in the area	130	39	202	31	34	78	1,325	**1,839**
	7.1%	*2.1%*	*11.0%*	*1.7%*	*1.8%*	*4.2%*	*72.1%*	
Restoring this missing species is important conservation work	146	52	203	32	71	140	1,195	**1,839**
	7.9%	2.8%	11.0%	1.7%	3.9%	7.6%	65.0%	
The project benefits outweigh the risks	148	54	196	43	64	202	1,132	**1,839**
	8.0%	2.9%	10.7%	2.3%	3.5%	11.0%	61.6%	8.0%

Table 11. Index of formal positions submitted to project team.

Reference	Formal positions of landowners / landmanagers
1.1	Letter of support from Westacre Estate
1.2	Letter of support from Stanhoe Farms
1.3	Letter of support from Upper Deben Farms
1.4	Letter of support from Doddington Farms
1.5	Letter of support from Houghton Estate
1.6	Letter of support from Glovers Farm
1.7	Letter of support from Carbrooke Hall
1.8	Letter of support from Somerleyton
1.9 (co-signed w/ 1.8)	Letter of support from Great Glemham
1.10	Letter of support from North Farm Livestock
1.11	Letter of support from Deepdale Farm
1.12	Letter of support from Massingham Farm
1.13	Letter of support from Burnham Thorpe Shooting Rights holder
1.14	Letter of support from Ranworth Farms
1.15	Letter of support from Maple Farms
1.16	Statement of position from Holkham Estate
1.17	Statement of position from Park Farm, Snettisham

Submitted in a separate document

Reference	Formal positions of organisations / membership bodies
2.1	Letter of support from Forestry England
2.2	Letter of support from National Trust, Norfolk Coast & Broads
2.3	Letter of support from RSPB, Norfolk & Lincolnshire
2.4	Letter of support from Rewilding Britain
2.5	Letter of support from Wash Wader Ringing Group
2.6	Statement of position from the NFU
2.7	Statement of position from the NPA
2.8	Statement of position from the NSA

Included in Appendix 8

6. Project practicalities

6.1. Project Team

The project team is a partnership between the Roy Dennis Wildlife Foundation and the Ken Hill Estate. Two members of the Roy Dennis Wildlife Foundation are included in the project team: Roy Dennis MBE, and Dr. Tim Mackrill. Six members of the Ken Hill Estate are included: Dominic Buscall, Harry Buscall, [redacted], Rod Pilcher, [redacted]. Ken Hill Estate also proposes to include its marketing firm on relevant areas such as communications. All members of the project team will play a role in ensuring the ongoing success of the project.

The Ken Hill Estate will principally be responsible for managing the release site, feeding of juvenile eagles when in hacking cages, ongoing stakeholder and public engagement, liaison with local organisations, management of volunteers, and communications. [redacted]. However, Ken Hill would also seek to leverage the network of relationships with landowners, gamekeepers, farmers, and conservation organisations held by other members of the project team as part of its ongoing responsibilities. As such, it is likely that some ongoing responsibilities are not always fulfilled by the Project Officer, but by other members of the Ken Hill team.

Members from the Roy Dennis Wildlife Foundation are responsible for the collection, safe transportation, and release of the birds each year, as well as guiding research and monitoring of the birds. Being among a few national experts on White-tailed Eagles, they are also responsible for liaising with stakeholders on particularly complex matters of ecology or behaviours.

6.2. Project Steering Group

If a licence is granted, a Project Steering Group will be set-up as per the ongoing Isle of Wight project. The following organisations will be invited to join:

- Roy Dennis Wildlife Foundation

- Ken Hill Estate
- Norfolk Wildlife Trust
- Lincolnshire Wildlife Trust
- Royal Society for the Protection of Birds
- The National Trust
- Norfolk Rivers Trust
- Natural England regional advisory team
- Visit West Norfolk
- CLA
- GWCT
- Norfolk FWAG
- NFU
- NPA
- BFREPA
- NSA
- Holkham NNR
- Broads Authority

An independent Chair will be appointed to the Steering Group (by the RDWF and Ken Hill) and will serve for five years, with Natural England acting as deputy chair. The core responsibilities of the group will be:

- To assist the Roy Dennis Wildlife Foundation and Ken Hill with undertaking the White-tailed Eagle Reintroduction project, by sharing information, experience and advice.
- The Steering Group will meet to monitor and evaluate the progress of the project, to address any issues and identify any conflicts. Ensure the project's on going compliance with all licences, regulations and agreements.
- The Steering Group will establish and receive reports from the Monitoring and Evaluation group.
- The Steering Group will receive reports from the project team prior to each meeting to report on project progress.

- To help facilitate better communication, participation and liaison, following the Communications plan

The full terms of reference for the group are included in Appendix 6.

6.3. Project Monitoring & Evaluation Group

In addition to the Steering Group, the project team will establish a Monitoring and Evaluation Group to assist with delivery of the project's Monitoring and Evaluation Plan. The group would include a representative from each of the following groups:

- Ken Hill Estate
- Roy Dennis Wildlife Foundation
- Royal Society for the Protection of Birds
- Norfolk Wildlife Trust
- Lincolnshire Wildlife Trust
- Wash Wader Ringing Group
- University of East Anglia
- The National Trust
- Natural England regional advisory team

An independent Chair will be appointed to the Monitoring & Evaluation Group (by the RDWF and Ken Hill) and will serve for five years, with Natural England acting as deputy chair. The core responsibilities of the group will be:

- to help set up a monitoring and evaluation programme for the project and make sure it is fit for purpose.
- to receive and comment on the annual research carried out by the project team.
- to identify areas needing further evidence and research, and to structure how to conduct that research and report results back to the Steering Group.
- to enable suitable evidence and data collection to support review and evaluation of the project's progress against key milestones and any potential need for management, alongside supporting evidence collection for wider understanding and academic research.

- to respond to requests from the Steering Group on areas identified as needing further investigation and to enable evaluation against project objectives or licence conditions.
- to liaise with other reintroduction projects across the UK and abroad and draw in any research from them.
- to help facilitate better communication, participation and liaison.

The Monitoring and Evaluation Group will normally consist of no more than 9 members as listed above. This is a lower number than on the Isle of Wight project. The project team for the Ken Hill project believe that the Monitoring and Evaluation group should be agile, and able to respond to requests from the Steering Group – where all key interests are represented – in a timely and high quality manner. Increasing the number of members of the Monitoring and Evaluation Group would restrict its ability to do so.

The full terms of reference for the group are included in Appendix 6.

6.4. White-tailed Eagle Information/Watchpoints

Satellite tracking data and field observations will be used to closely monitor the dispersal and settlement patterns of juvenile eagles after release. Experience from the Isle of Wight and elsewhere in the species' range indicates that some individuals will disperse widely during their first two years while others are likely to remain more local during this period. The location of the satellite tagged birds will not be actively promoted by the project team when the birds are on private land or sensitive sites, but an aspiration during the early phase of the project will be to set-up White-tailed Eagle viewpoints in suitable locations with sufficient visitor infrastructure. A flexible approach will need to be taken in view of the unpredictable nature of the initial movements of the released birds. It is very likely that a partnership approach with other landowners and nature conservation organisations will be required. This will be an important means by which to avoid disturbance to any SPA sites by eagle tourists.

There is also potential to establish additional White-tailed Eagle feeding areas (see also Section 5.8) in strategic places in West Norfolk which could help draw the birds away from any potential conflicts/sensitive areas. These may or may not be publicly accessible.

As the project progresses and the first breeding pairs become established it would be beneficial to establish at least one public viewpoint at an active nest at a site capable of supporting the expected footfall. A similar approach is taken on the Isle of Mull (https://mulleaglewatch.com/) and helps to ensure that nests in more sensitive sites and on private land are left undisturbed. This approach has also been successfully undertaken following the Osprey reintroduction at Rutland Water.

A comprehensive Visitor Management Strategy covering these various issues is included in Appendix 4.

6.5. Number of birds to be released

The initial aim of the project is to establish a breeding population of 6-10 pairs of White-tailed Eagles within 50 km of the release site at Ken Hill (i.e. the likely natal dispersal of released juveniles). This, in time, will facilitate expansion to other parts of the eastern region. It is possible, and hoped, that this process of recolonisation will be aided by immigration from the expanding populations in continental Europe, particularly the Netherlands, Denmark and France, as well as birds from the Isle of Wight. Although there has been a recent increase in the number of continental White-tailed Eagles visiting eastern England, as well as visits by individuals released on the Isle of Wight – most notably G393 – strong conspecific attraction in the species means that these birds are only likely to remain if they encounter other White-tailed Eagles.

We aim to release a total of 60 juvenile White-tailed Eagles, with an equal ratio of males and females, over a five-year period. Given expected survival rates this would be sufficient for an initial population of 6-10 breeding pairs to become established. A population model was devised in order to plot the predicted growth of the population

in the early stages (Figure 23). This model assumes that 12 birds are released each year for a period of five years, although it may be advisable to release a smaller number of birds (i.e. 6-8) in the first year to ensure that all translocation, husbandry, release and monitoring techniques are effective. The parameters used in the model were conservative estimates based on known survival and breeding productivity of the newly-established White-tailed Eagle population in Ireland, as well as data from the early stages of the population expansion in Scotland (Mee et al 2017) (annual survival of juveniles in their first year = 75%, annual survival of all birds thereafter = 90%, breeding productivity = 0.75). This predicts that of the initial birds released, 24 will survive to breeding age (5 years), with the first pair likely to breed in the sixth year of the project. This corresponds with recruitment estimates for wild-bred birds in the Scottish population where modelling estimated the probability of reaching recruitment age at 53% and 37% for wild-bred and released birds respectively (Evans et al. 2009). In later years it may be possible to supplement the release of juvenile eagles with sub-adult birds. We are currently investigating this latter option.

Table 12 shows the population expansion that has occurred in Ireland following the release of 100 White-tailed Eagles between 2007 and 2011. By 2020, a total of 31 chicks had fledged from 61 breeding attempts. It should be noted that the decline in the number of territorial pairs observed between 2014 and 2019 was the result of the loss of several breeding birds to illegal poisoning and also Avian Influenza (Mee et al 2017; Mee 2020). This serves to emphasise the importance of minimising any such losses, especially of adult and sub-adult White-tailed Eagles, in the early years of the project. Autumn/winter food provision for released juveniles will be one key way to increase survival of first year birds. It is also important that the project replicates work undertaken for the Isle of Wight project whereby landowners and other land managers are informed when a White-tailed Eagle settles in a specific area. Our experience to date indicates that this approach considerably reduces the risk of any conflict occurring, and is welcomed by various stakeholders. Other means to reduce risks to juvenile, sub-adult and adult White-tailed Eagles are being assessed in an ongoing a disease/hazard risk assessment being undertaken by the Disease Risk Analysis and Health Surveillance (DRAHS) team at Zoological Society of London. This document will be submitted to Natural England separately.

Following a review of population data and survivorship of the Irish population, a supplementary second release phase over three years (2020-2022) was initiated by the National Parks and Wildlife Service (NPWS). Two new areas were chosen for release, one on the south end of Lough Derg, Tipperary, and also on the lower Shannon estuary on the Kerry-Limerick border, on the south side of the estuary. Ten birds (5 males and 5 females) were collected under license in Norway in the Trøndelag and Flatanger areas of west central Norway, and transported by charter flight to Ireland in late June. Birds were released in early to mid-August and have been monitored by NPWS since release. Birds are now beginning to disperse more widely in the release area and elsewhere in SW Ireland. Further releases are anticipated in 2021 and 2022 (Mee 2020).

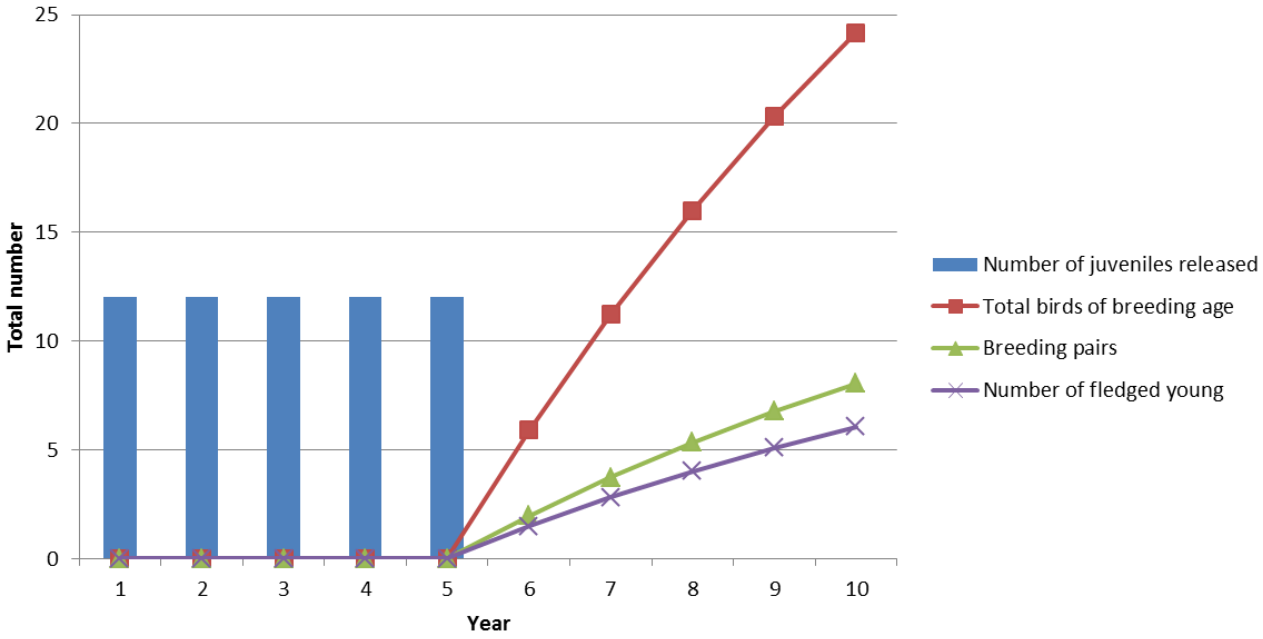


Figure 23. Expected growth of the White-tailed Eagle population in the first ten years.

The loss of established adult birds, coupled with low breeding success of existing breeders - caused by factors such as weather and food availability - necessitated the need for additional releases in Ireland, but we do not consider this likely in eastern England. High prey availability, particularly in coastal areas, and favourable climatic conditions in eastern England, indicate that breeding success of White-tailed Eagles will be higher than corresponding figures in Scotland and Ireland, and more akin to

those recorded in continental Europe, particularly the Netherlands and Denmark. The mean annual productivity of the Scottish population is 0.67 chicks per territorial pair (Sansom et al 2016), which is considerably less than in other parts of Europe where White-tailed Eagles are breeding close to the coast. For example, the productivity of pairs situated within 10km of the Baltic Sea coast is 1.04 in Germany, 1.1 in Poland, 1.18 in Lithuania, 1.3 in Latvia, 1.02 in Estonia, 0.99-1.31 in Finland, 1.1-1.10 in Sweden and 1.52 in Denmark (HELCOM 2016). This will aid the establishment of a self-sustaining population, particularly if the presence of breeding White-tailed Eagles in the region promotes immigration from continental Europe, as hoped. This should negate the need for any additional releases in the future, but the situation will be monitored closely. The number of birds in a pool of breeders and potential breeders will be assessed once 60 birds have been released. If survival rates at that point are equal or higher than the predictions made here, and that settlement patterns are as expected, there should not be a need for further releases.

Table 12. Breeding attempts of White-tailed Eagles in Ireland following the release of 100 birds between 2007 and 2011.

Year	Territorial pairs	No active nests (eggs laid)	Successful pairs	No fledged young	No fledged per nesting pair	No fledged per successful nest
2010	1	0	-	-	-	-
2011	4	0	-	-	-	-
2012	6	1	0	0	-	-
2013	10	3	1	2	0.66	2.0
2014	14	7	1	1	0.14	1.0
2015	13	8	4	4	0.5	1.0
2016	10	9	6	7	0.78	1.2
2017	10	9	5	7	0.78	1.4
2018	12	10	4	4	0.4	1.0
2019	9	7	1	1	0.14	1.0
2020	9	9	4	5	0.56	1.3

6.6. Collection and translocation of birds from Poland

See also Appendix 1 for greater detail on sections 6.6-6.9.

Young birds will be collected under licence from Polish nests by a team of highly-skilled local fieldworkers led by White-tailed Eagle expert, Dr Tadeusz Mizera. In each case a single chick aged approximately eight-ten weeks will be taken from broods of two-three young, and kept at a temporary holding facility close to the collection area where stringent hygiene protocols will be observed. Only healthy young will be collected for translocation and this work will be undertaken over the shortest period possible to minimise the time birds are held in Poland prior to translocation to Ken Hill. Young birds will be collected from a maximum number of nests over the course of the five years to ensure the greatest possible genetic diversity. Each individual bird will be ringed and colour ringed, and biometrics recorded. Blood and saliva samples will be taken for sex confirmation and maintaining a gene data base.

Once a full cohort of young birds have been collected, they will be assessed by a Polish vet and then transported to West Norfolk in individual carrying crates. The movement of the birds will require an export licence from Poland to the UK, a CITES licence and an import licence to the UK. The project team will be careful to follow all required protocols and have the relevant permission in place well in advance of intended translocation. We have extensive experience of transporting eagles by air and land, and have been offered assistance by a pilot who is willing to fly the eagles from Poznan airport to Norfolk in a light aircraft. This would significantly reduce transport time compared to road. The same pilot is also assisting with the ongoing Isle of Wight project. Road transport will be used as a back-up in case of any unforeseen circumstances. The project team has considerable experience of feeding and resting young raptors in transit. We will abide by the current transportation guidelines for animals during the journey.

6.7. Release site

The project team has located a suitable release location [redacted] (Figure 24 and Figure 25). The release pens will be sited on a private part of [redacted] on the edge of a [redacted] mixed woodland with numerous mature trees. The pens will face [redacted]. The [redacted] lends itself to the provision of feeding 'tables' where food will be provided during the post-release phase. This method has been used successfully on the Isle of Wight and the elevated nature of the 'tables' excludes mammalian scavengers such as foxes and badgers. The whole field will be viewed from a secluded hide, which can be accessed from within cover, in order not to disturb eagles after release. There is a nearby facility for a caravan and electricity supply which will house CCTV images from the release pens and enable the birds to be monitored remotely prior to release and also when they return to the area post-release. The exact release site will be kept strictly confidential in order to prevent disturbance to the birds during the critical periods pre- and post-release.

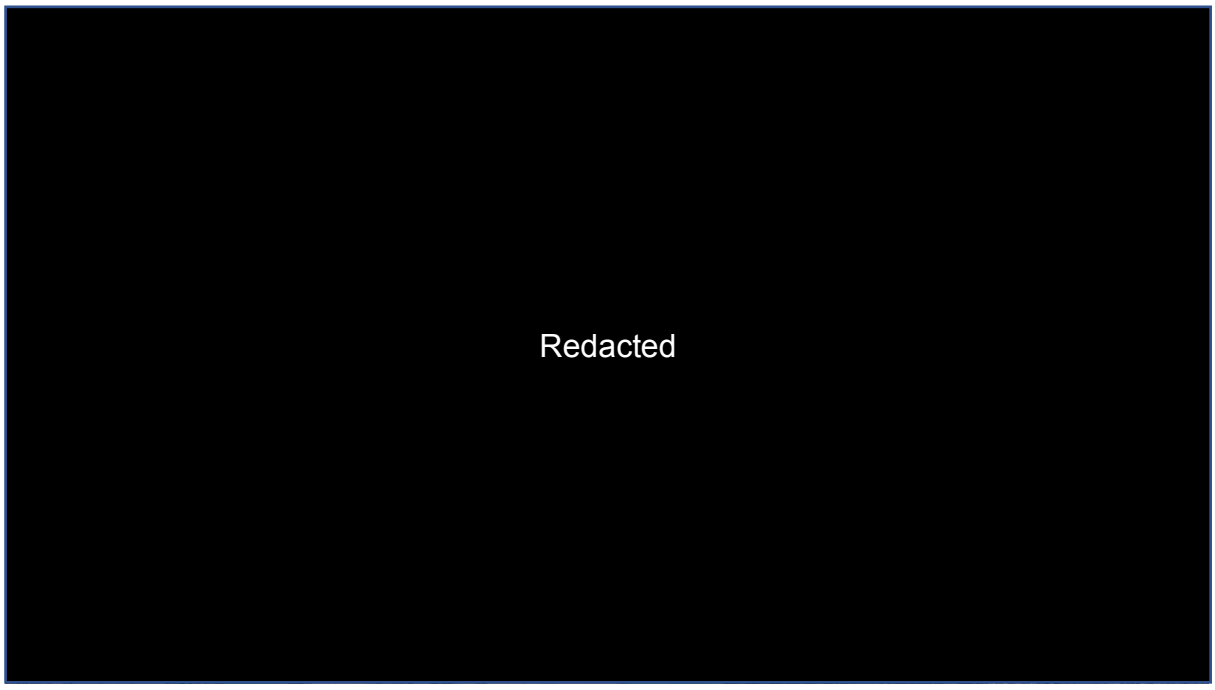


Figure 24. The proposed release site location at [redacted].

Figure 25. The proposed site for the release pens [redacted].

6.8. Release strategy

The release pens will be modelled on those used for the reintroduction projects in the Isle of Wight, Scotland and Ireland (Figure 26). They measure 4m x 4m x 2m, with exterior ply walls to the back and sides. An artificial nest is located at the rear of each cage and plentiful food (fish, meat) can be placed through a hatch in the back wall directly on to the nest, thereby keeping human contact to an absolute minimum. The young White-tailed Eagles need to be kept in the pens, in groups of 2-3 until they are a week past flying age. CCTV in each pen will monitor the individual eagles and will be connected by cable to the caravan or temporary project hut. The CCTV recordings will be archived and used for playback to check progress of the young. Before release all individuals will be fitted with satellite transmitters in order to monitor post-release movements, and very small VHF transmitters for local checking

in the first few months. They will also be health screened by an experienced avian vet at this point.

The birds are released by lowering the front door of the pen, using a series of ropes that can be operated from the rear, to ensure that the birds are not flushed, and leave the pens at their own volition.

Figure 26. Young White-tailed Eagles in release pens on the Isle of Wight as the front of the pen is lowered on release day.

Like on the Isle of Wight, the birds will be fitted with Ornitela GSM satellite transmitters to enable very high temporal resolution data collection. This will allow the project team to monitor the daily movements of the released birds in detail, particularly during spring-autumn when battery voltage in the solar-powered transmitters is highest. The project team will also endeavour to make visual contact with each individual White-tailed Eagle on a regular basis, and several times a week during the initial stages. Field observations have been key in the ongoing monitoring of the Isle of Wight birds. The high resolution tracking also enables nigh time roosts to be located, which greatly facilitates collection of prey remains and pellets. We will

also seek the help of local communities and birdwatchers with requests to report sightings to the project through a dedicated website and social media presence.

6.9. Post-release feeding

Young White-tailed Eagles, in the wild, are dependent on their parents for food for several months after they leave the nest. We will provide food on the elevated feeding tables close to the release pens (see above and Appendix 1) to mimic this behaviour. Our aim is to maintain these feeding sites throughout the autumn and winter so that the young do not disperse too rapidly and can build up group dynamics. If some birds move and settle in new areas, we will examine the potential of creating carrion feeding sites in those areas.

6.10. Ongoing monitoring

Ongoing monitoring will be an essential element of the project both in terms of the welfare of the birds and their impacts on existing fauna and economic interests. As noted above, the birds will all be fitted with tail mounted VHF radio transmitters and back-pack satellite transmitters prior to release to enable the project team to accurately monitor their subsequent movements.

Previous research has shown that juvenile White-tailed Eagles may disperse widely in their first two years. Estimated maximum juvenile dispersal distance (JDD), as measured from natal (or release) sites, ranged from about 18 to 200 km in different individual White-tailed Eagles in Scotland, with a median JDD of 90.6km for females and 78.4 km for males (Whitfield et al 2009). In Scotland there was a tendency for males to disperse further than females in the first year of life, but for females to be further from natal sites in their second year (Whitfield et al. 2009). These data were based on sightings of wing-tagged birds, but satellite tracking of the juvenile White-tailed Eagles released on the Isle of Wight has shown that they have dispersed even more extensively, with one bird summering in the Lammermuir Hills in southern Scotland, and two others in the North York Moors. Two of these individuals have since returned to the Isle of Wight., including G393 which spent five months in West Norfolk from August 2020. It eventually returned to the Isle of Wight in early February 2021 having spent 17 months away. During that period, it flew 4904 km and it's GPS transmitter logged 71,036 GPS fixes. It is very likely that birds released in West Norfolk will behave similarly.

If individual birds disperse into new areas, efforts will be made by the project team to liaise with key local stakeholders and to monitor the bird visually on a regular basis. Satellite tracking data will be published on the Roy Dennis Wildlife Foundation and Wild Ken Hill websites on a frequent basis, although the project will not publicise the locations of birds if they are on private land or sensitive sites. The project team are extremely experienced in monitoring raptors by satellite tracking and any unusual movements or loss of data will be investigated with the utmost urgency.

The project team have devised a comprehensive Monitoring and Evaluation Plan that outlines all key monitoring work that will be undertaken as part of the project (Appendix 3). There is potential for PhD/MSc research to contribute to this, and so a key element of the project's monitoring work is to establish partnerships with universities. An annual Monitoring and Evaluation report will be produced each year.

6.11. Exit strategy

As described in section 6.1, a project steering group will be established to review the annual progress of the project. Given the success of other White-tailed Eagle reintroduction projects in Scotland and Ireland, the distribution of the species in other parts of lowland Europe, and the measures included in this feasibility report to minimise and mitigate any risk to the birds themselves, the local ecosystem, and any socio-economic interests, we are confident that the project will result in a self-sustaining population of White-tailed Eagles becoming established in eastern England without causing any ecological or socio-economic problems. Nevertheless, there is potential to halt the project should any unforeseen issues arise. The project will be reviewed annually by the steering group in conjunction with the monitoring and evaluation group and if there was clear evidence that it was causing ecological or socio-economic harm a decision could be made to implement the exit strategy at any point in the first five years of the project. The process by which such a decision would be reached is explained in Appendix 5.

If it proved necessary to implement the exit strategy, efforts would be made to catch any free-living White-tailed Eagle released by the project. In recent years individual

raptor workers have become expert at catching adult eagles for satellite-tracking studies using bow traps. The project team have consulted with these expert fieldworkers who have agreed to assist the project with trapping should it be required. The project team has the necessary skills to assist, and we would request the services of other experienced bird ringers to provide additional support. It is also important to consider that it is very likely that experience in catching live White-tailed Eagles in Scotland will progress over future years given that efforts are currently underway to catch adult birds for satellite tagging as part of the NatureScot Sea Eagle Monitoring Scheme. Furthermore, the project team have recently purchased a bow trap that can be operated remotely at a distance of up to a mile. Any re-captured birds would be housed temporarily at Ken Hill before being transported back to Poland and re-released in their original natal areas once the necessary permissions had been secured.

Clearly the logistics and costs of implementing the exit strategy would depend on how far the project had progressed, and as such, it will be essential to review any impacts of the project on an annual basis. Furthermore, it may be advisable to release a smaller number of birds in year one of the project. Here we have estimated the costs of implementing the exit strategy in year 2 and year 5, based on expected survival of the birds after release (annual survival of juveniles in their first year = 75%, annual survival of all birds thereafter = 90% - see section 6.5).

6.11.1. Example exit strategy in year 2

The juvenile eagles will be supplementary fed close to the release site during their first winter, and it would be relatively straightforward to catch the birds during this period. However, it is likely that some birds will begin to move away from the release site three-six months after release. As detailed in section 6.10, studies have shown that juvenile White-tailed Eagles may disperse considerable distance in their first two years. If eight birds were released in the first year of the project we would expect 6 individuals to be alive one year after release, and these birds may by that stage have dispersed widely across England. It will be possible to monitor these movements closely using satellite tracking and this will make it considerably easier to catch birds during this period. Favoured roost sites will be pinpointed using the satellite data and bow traps set-up at these locations. Once caught the birds would be housed

temporarily at the release pens at Ken Hill and then transported back to the area in which they were collected as soon as possible. Estimated costs of this work are shown in Table 13.

Table 13. Estimated costs of exit strategy in year 2.

Activity	Cost
Expert assistance (£250 per day) - based on 3 days to catch each bird. Total 18 days.	£4,500
Fuel and transport for trapping fieldwork – based on mean 250 km per bird.	£500
Transport	£2,000
Food and accommodation costs for expert assistance. Based on 18 days fieldwork (£150 per day).	£2,700
Other miscellaneous costs	£300
TOTAL	**£10,000**

6.11.2. Example exit strategy in year 5.

If it was necessary to implement the exit strategy in year five of the project then the associated logistics and costs would be significantly greater. However, the same basic principles would be used, with favoured roost sites located by satellite tracking and bow traps subsequently set up nearby. Research in Scotland, and evidence from the Isle of Wight, has shown that juvenile dispersal is greatest in the first two years of life, and after that period they tend to return closer to their natal site (Whitfield et al 2009). As such the catching area would principally cover Norfolk, Lincolnshire, Cambridgeshire and Suffolk, with some younger birds more widely dispersed.

Give the expected survival of birds we might expect a total of 28 birds to be alive by year 5 of the project, as shown in Table 14.

Table 14. Expected survival of juvenile White-tailed Eagles by year 5 of the project.

Year of release	Total released	Total alive in year 5
1	8	4
2	12	7
3	12	8
4	12	9
TOTAL	**44**	**28**

Catching a total of 28 birds would require a longer period of time, but we would ensure that members of the project team and other qualified bird ringers were trained in the use of bow traps to enable at least two catching teams to operate simultaneously, and thus reduce the overall time required to catch the birds by half. Estimated costs are shown in Table 15.

Table 15. Estimated costs of exit strategy in year 5.

Activity	Cost
Expert assistance (£250 per day). Total 42 days.	£10,500
Additional bow trap	£300
Fuel and transport for trapping fieldwork – based on mean 250 km per bird.	£2,000
Transport	£5,000
Food and accommodation costs for expert assistance. Based on 42 days fieldwork (£150 per day).	£6,300
Other miscellaneous costs	£900
TOTAL	**£25,000**

6.11.3. Catching individual birds

In addition to implementing the full exit strategy, it would also be possible to catch individual birds if there was clear evidence of a particular individual causing severe socio-economic or ecological damage. A separate licence would be required from Natural England for this, as outline in Appendix 5.

If it was deemed necessary to capture a problem bird, arrangements would be made to catch the individual using the project's bow trap. The bird would then be transferred to a suitable licenced locality such as a wildlife park or falconry centre, to be kept in permanent captivity.

In addition, any ill or injured birds (pre- or post-release) would be assessed by an experienced avian vet. If (re-)release was not possible, a decision would then be taken to either transfer the bird to a suitable wildlife park or falconry centre, or to euthanise it, depending on the vet's recommendations.

6.11.4. Funding

We can confirm Roy Dennis Wildlife Foundation and the Ken Hill Estate have the required contingency funds to carry out all aspects of the exit strategy as detailed here.

6.12. Communications strategy

Given the likely high-profile nature of the project, we have devised a thorough communications strategy. This is included in Appendix 7.

6.13. Funding

The total project cost over its lifetime is conservatively estimated to be [redacted]. A breakdown of estimated project costs is provided in Table 16.

[redacted]

[redacted]

Table 16. Breakdown of estimated project costs.

Estimated project costs	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Project team Project officer comp. Volunteer expenses **Equipment** Initial capex Satellite & VHF transmitters **Animals** Bird collection & transport **Consultancy** Feasibility study Annual support	Redacted						
Total costs							
All figures are in £ *Based on 12 chicks per year being collected for five years*							

The degree of uncertainty around project costs is driven by being unable to predict the number of chicks collected each year, which in turn affects the number of satellite transmitters required and the spend on bird collection and transport. For example, if six chicks were collected rather than 12 in a given year, the satellite and VHF transmitter cost would be roughly half of budgeted.

6.14. Key project milestones

6.14.1. Release of 60 juvenile White-tailed Eagles

The project aims to release a total of 60 White-tailed Eagles over a five-year period. This would involve the translocation of 12 birds per year, but, as the first two years of the Isle of Wight project demonstrate, this is not always possible. Furthermore, translocating a smaller number of birds is advisable in the first year for practical reasons. A ten-year licence period would be useful in this regard because it would

enable any additional birds to released in year six, and potentially year seven, if the full cohort of 60 birds had not been translocated during the initial five-year period.

Once the full complement of 60 birds have been translocated, the project team will review the survival in order to make an objective assessment of whether any further releases are required. Population modelling (Section 6.5) indicates that the release of 60 birds will be sufficient to establish an initial breeding population of 6-10 pairs if survival to five years is 35-40% (as per Scottish reintroduction). Thus, additional releases would only be required if survival was lower than this figure. A clear understanding of the reasons for higher-than-expected mortality would be required before the release of any further birds would be considered.

6.14.2. First breeding attempts

White-tailed Eagles do not reach breeding age until 4-5 years, and so the first breeding attempts are not expected until at least 2025-26 if the first birds were released in 2021. Furthermore, the inexperience of first-time-breeders means that initial attempts may fail. The project team will closely monitor any breeding activity and liaise closely with landowners to ensure the birds are not disturbed. This will give the birds the maximum chance of success.

6.14.3. First successful breeding

The first successful breeding attempt by birds released at Ken Hill will be a significant milestone for the project. This is likely to occur 5-10 years after the first juveniles are released. Once established, breeding White-tailed Eagles show strong site fidelity and, as such, these breeding birds will be key to the establishment of the population. Annual survival of breeding adults will be closely monitored by the project team. In Ireland, additional releases were deemed necessary due to mortality of key breeding adult birds (to a variety of causes) and a very poor breeding season in 2019. As such, the productivity of breeding pairs, and annual survival of breeding adults will be reviewed on an annual basis. If breeding adults are lost, or breeding success is very low, consideration could be given to further releases of juvenile birds in order to supplement the establishing population, assuming the causes of mortality and breeding failure are clearly understood. Ten juvenile White-tailed Eagles were

released in Ireland in 2020 with the translocation of a further 20 birds planned over the course of the next two years. This is expected to give the population the required demographic boost.

6.14.4. Breeding of first wild-fledged chick

The key to the establishment of a self-sustaining population of White-tailed Eagles is that wild-fledged birds begin to breed themselves. In Ireland this occurred for the first time in 2020, thirteen years after the first birds were released. As such it is expected that the offspring of translocated birds will breed for the first time, 12-15 years after the first birds have been released.

6.14.5. Establishment of a population of 6-10 pairs

Population modelling shows that the release of 60 birds at Ken Hill should result in the establishment of a population of 6-10 breeding pairs, likely within 50 km of the release site. This is expected to occur 10-20 years after the first release. Once this initial population is established, it will facilitate expansion to other areas. Annual breeding attempts and geographical expansion of the population will be closely monitored throughout this period.

References

Adamski A., Lontkowski J., Maciorowski G., Mizera T., Rodziewicz M., Stawarczyk T., Wacławek K. 1999. Rozmieszczenie i liczebność rzadszych gatunków ptaków drapieżnych w Polsce w końcu 20.wieku. Notatki Ornitologiczne 40 (1-2): 1-22.

AHDB. 2020. UK Pig Facts and Figures – 2019 https://projectblue.blob.core.windows.net/media/Default/Pork/Pork%20MI%20files/uk-pig-facts-and-figures_2506_190507_web.pdf

Anderwald D., Przybyliński T. 2011. Porównanie populacji lęgowej bielika Haliaeetus albicilla w Pradolinie Warszawsko-Berlińskiej PLB100001 i na Wielkim Sandrze Brdy PLB 220001. Stud. i Mat. CEPL, Rogów, 2 (27): 105-113.

Anderwald, D., Przybyliński, T. and Zawadzka, D. 2013. Best Practice Manual for the Protection of the Birds of Prey. Lasy Pañstwowe (Polish State Forests)

Augère-Granier, M.L. 2020. The EU pig meat sector. EPRS | European Parliamentary Research Service.

Belka, T. and Horal, D. 2009. The White-tailed Eagle (Haliaeetus albicilla) in the Czech Republic. Denisia 27: 65-77.

Bell, D. 2020. Losing lagomorphs to disease. BTO Research Report 726 ed. Thetford: British Trust for Ornithology

Bestman, M. and Bikker-Ouwejan, J 2020. Predation in Organic and Free-Range Egg Production. Animals 10: 177; doi:10.3390/ani10020177

Burton, N.H.K., Armitage, M.J.S., Musgrove, A.J. & Rehfisch, M.M. 2002. Impacts of man-made landscape features on numbers of estuarine waterbirds at low tide. Environ. Manage. 30: 857–864.

BirdLife International. 2015. European Red List of Birds. Luxembourg: Office for Official Publications of the European Communities.

Bloomfield, A.I. 2019. The Return of the Eurasian Spoonbill to the United Kingdom and the First Modern Colony at Holkham National Nature Reserve. In: Champagnon J., Kralj J., Cano Alonso, L. S. & Sundar, K. S. G. (ed.) Proceedings of the IX Workshop of the AEWA Eurasian Spoonbill International Expert Group. IUCN-SSC Stork, Ibis and Spoonbill Specialist Group Special Publication 2. Arles, France.

Border, J.A., Massimino, D., and Gillings, S. 2018. Potential Future Distribution and Abundance Patterns of Common Buzzards Buteo buteo. Research Report 707 British Trust for Ornithology: Thetford, UK.

Burton, N.H.K., Armitage, M.J.S., Musgrove, A.J. & Rehfisch, M.M. 2002. Impacts of man-made landscape features on numbers of estuarine waterbirds at low tide. Environ. Manage. 30: 857–864.

Champagnon J., Kralj J., Cano Alonso, L. S. & Sundar, K. S. G. (ed.) 2019. Proceedings of the IX Workshop of the AEWA Eurasian Spoonbill International Expert Group. IUCN-SSC Stork, Ibis and Spoonbill Specialist Group Special Publication 2. Arles, France. ISBN 978-2-491451-00-4.

Clausen, K.K., Madsen, J., Cottaar, F., Kuijken, E. and Verscheure, C., 2018. Highly dynamic wintering strategies in migratory geese: Coping with environmental change. Global change biology, 24(7): 3214-3225.

Collop, C., Stillman, R.A., Garbutt, A., Yates, M.G., Rispin, E. & Yates, T. 2016. Variability in the area, energy and time costs of wintering waders responding to disturbance. The Ibis 158: 711–725.

Cramp, S. 1980. Handbook of the Birds of Europe, the Middle Eastand North Africa: The Birds of the Western Palearctic. Vol. II: Hawks to Bustards. Oxford UK: Oxford University Press.

DEFRA. 2020. Defra Statistics: Agricultural Facts - England Regional Profiles

Delibes, M. and Hiraldo, F. 1981. The rabbit as prey in the Iberian Mediterranean ecosystem. In: Proceedings of the World Lagomorph Conference, Guelph, 1979 (Ed. by C.D. MacInnes & K. Myers), pp. 614–622. University of Guelph, Guelph, Canada.

Dementavičius, D., Rumbutis, S., Virbickas, T., Vaitkuvienė, D., Dagys, M. and Treinys, R., 2020. Spatial and temporal variations in the White-tailed Eagle Haliaeetus albicilla breeding diet revealed by prey remains. Bird Study 67(2): 206-216.

Dennis, R.H., Doyle, J., Mackrill, T.R. and Sargeant, L. 2019. The feasibility of reintroducing White-tailed Eagles Haliaeetus albicilla to the Isle of Wight and the Solent.

Ekblad, C. M. S., Sulkava, S., Stjernberg, T. G. & Laaksonen, T. K. 2016: Landscape-scale gradients and temporal changes in the prey species of the white-tailed eagle (Haliaeetus albicilla). Ann. Zool. Fennici 53: 228–240.

Ekblad, C., Tikkanen, H., Sulkava, S. et al. 2020. Diet and breeding habitat preferences of White-tailed Eagles in a northern inland environment. Polar Biol 43, 2071–2084 https://doi.org/10.1007/s00300-020-02769-1

Environment Agency. 2020. TraC Fish Counts for all Species for all Estuaries and all years

Environment Agency. 2020b. Freshwater Fish Surveys (NFPD)

Estes, J.A., Terborgh, J., Brashares, J.S., Power, M.E., William, J.B., Bond, J., Carpenter, S.R., Essington, T.E., Holt, R.D., Jackson, J.B.C., Marquis, R.J., Oksanen, L., Oksanen, T., Paine, R.T., Pikitch, E.K., Ripple, W.J., Sandin, S.A., Scheffer, M., Schoener, T.W., Shurin, J.B., Sinclair, A.R.E., Soulé, M.E., Virtanen, R. and Wardle, D.A. 2011 Trophic Downgrading of Planet Earth. Science 333 (6040): 301-306.DOI: 10.1126/science.1205106

Evans, R.J., Broad, R.A., Duffy, K., MacLennan, A.M.,Bainbridge, I.P. and Mudge, G.P. 2003. Re-establishment of a breeding population of White-tailed Eagles in Scotland. In Helander, B., Marquiss, M. & Bowerman, W. (eds) Sea Eagle 2000. Proceedings from an International Conference at Björkö, Sweden, 13–17 September 2000: 397–403. Swedish Society for Nature Conservation, Stockholm.

Evans R.J, Wilson J.D., Amar A., Douse A., MacLennan A., Ratcliffe N. and Whitfield D.P. 2009 Growth and demography of a reintroduced population of White-tailed Eagles Haliaeetus albicilla. Ibis 151: 244–254.

Evans, R.J., O'Toole, L. and Whitfield, D.P. 2012 The history of eagles in Britain and Ireland: an ecological review of place name and documentary evidence from the last 1500 years. Bird Study, 59:3, 335-349.

Ferrer, M. & Negro, J.J. 2004. The near extinction of two large European predators: super-specialists pay a price. Conservation Biology, 18: 344–349.

Fischer W. 1984. Die Seeadler. A. Ziemsen Verlag, Lutherstadt Wittenberg.
Forestry England. 2021. Thetford Forest.

Frost, T.M., Calbrade, N.A., Birtles, G.A., Mellan, H.J., Hall, C., Robinson, A.E., Wotton, S.R., Balmer, D.E. and Austin, G.E. 2020. Waterbirds in the UK 2018/19: The Wetland Bird Survey. BTO/RSPB/JNCC. Thetford.

Gill, J.A. 1996. Habitat choice in wintering pink-footed geese: quantifying the constraints determining winter site use. Journal of Applied Ecology 33: 884–892.

Gryz, J. and Krauze-Gryz, D. 2019. Pigeon and Poultry Breeders, Friends or Enemies of the Northern Goshawk Accipiter gentilis? A Long-Term Study of a Population in Central Poland. Animals 9: 141 doi:10.3390/ani9040141

Gibbons, D. W., Reid, J.B. and Chapman, R. A. 1993 The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991. T & AD Poyser, London.

Hailer, F., B. Helander, A.O. Folkestad, S.A. Ganusevich, S. Garstad, P. Hauff, C. Koren, V.B. Masterov, et al. 2007. Phylogeography of the white tailed eagle, a generalist with large dispersal capacity. Journal of Biogeography 34: 1193–1206.
Hall, A. J., Mcconnell, B. J., and Barker, R. J. 2001. Factors affecting first- year survival in grey seals and their implications for life history strategy. Journal of Animal Ecology, 70, 138–149. https://doi.org/10.1111/ j.1365-2656.2001.00468.x

Helander, B. and Stjernberg, T. 2002. Action plan for the conservation of White-tailed Sea Eagle (Haliaeetus albicilla). Council of Europe unpublished Report.

Helander, B., Bignert, A. and Asplund, L. 2008. Using Raptors as Environmental Sentinels: Monitoring the White-tailed Sea Eagle Haliaeetus albicilla in Sweden. AMBIO: A Journal of the Human Environment. 37(6): 425- 431.

HELCOM. 2016. White-tailed eagle productivity. HELCOM core indicator report. Online.

Horváth, Z. and Pintér, T. 2003. A hazai rétisas (Haliaeetus albicilla)- állomány fészkelőhely-választása a 2000. év felmérése alapján. Aquila 112: 23–32 (in Hungarian).

Houston, A.I., Prosser, E. & Sans, E. (2012). The cost of disturbance: a waste of time and energy? Oikos 121: 597– 604.

Isomursu, M., Koivusaari, J., Stjernberg, T., Hirvelä-Koski, V. and Venäläinen, E.R., 2018. Lead poisoning and other human-related factors cause significant mortality in white-tailed eagles. Ambio, 47(8): 858-868.

JNCC. 2020. The Harbour Seal.

Jurado, C., Martínez-Avilés, M., De La Torre, A., Štukelj, M., de Carvalho Ferreira, H.C., Cerioli, M., Sánchez-Vizcaíno, J.M. and Bellini, S. 2018. Relevant Measures to

Prevent the Spread of African Swine Fever in the European Union Domestic Pig Sector. Front. Vet. Sci. 5:77. doi: 10.3389/fvets.2018.00077

Källander, H. 2018. Flock-fishing deep-diving piscivores (Great Crested Grebe Podiceps cristatus, Great Cormorant Phalacrocorax carbo, Common Merganser Mergus merganser) at Lake Vombsjön, southern Sweden, and those that exploit them. Ornis Svecica 28(1): 14-18.

Kamarauskaitė, A., Dementavičius, D., Skuja, S., Dagys, M. and Treinys, R. 2020. Interaction between the White-tailed Eagle and Common Buzzard estimated by diet analysis and brood defence behaviour. Ornis Fennica 97(1): 26-37.

Keniger, L.E.; Gaston, K.J.; Irvine, K.N.; Fuller, R.A. What are the benefits of interacting with nature? Int. J. Environ. Res. Public Health 2013, 10, 913–935.

Knott, J, P. Newbery, and B. Barov (2009). Action plan for the red kite Milvus milvus in the European Union, 55 p.

Kiss, J.B., Marinov, M., Alexe, V., Sándor, D.A. 2013. Situaţia actuală şi preferinţele faţă de locurile de cuibărit ale codalbului (Haliaeetus albicilla) în Delta Dunării (România). Rev Silvic. Cineget 32: 139–142 (in Romanian).

Kristensen, M.L., Righton, D., del Villar-Guerra, D., Baktoft, H. and Aarestrup, K. 2018. Temperature and depth preferences of adult brown trout Salmo trutta during the marine migration phase. Mar Ecol Prog Ser 599:209–224.

Krone, O., Langgemach, T.P., Sommer, P., Kenntner, N. 2000. Causes of mortality in white-tailed sea eagles from Germany. In: Sea Eagle 2000 – an international conference. Bjorko, Sweden. Swedish Society for Nature Conservation / SNF. Pp211-218.

Krone, O., Berger, A., Schulte, R. 2008 Recording movement and activity pattern in a white-tailed sea eagle (Haliaeetus albicilla) by a GPS datalogger. Journal of Ornithology DOI: 10.1007/s10336-008-0347-1.

Krüger, O., Grünkorn, T. and Struwe-Juhl, B., 2010. The return of the white-tailed eagle (Haliaeetus albicilla) to northern Germany: Modelling the past to predict the future. Biological Conservation, 143(3): 710-721.
Lourenço, R., Penteriani, V., Rabaça, J.E. and Korpimäki, E., 2014. Lethal interactions among vertebrate top predators: a review of concepts, assumptions and terminology. Biological Reviews 89(2): 270-283.

Lees, A. & Bell, D.J. 2008. A conservation paradox for the 21st century: the European wild rabbit Oryctolagus cuniculus, an invasive alien and an endangered native species. Mammal Review 38: 304–320.

Lontkowski J., Stawarczyk T., 2003. Rozwój populacji, wybiórczość siedliskowa i efekt rozrodu bielika Haliaeetus albicilla na Śląsku w latach 1993-2001. Notatki Ornitologiczne 44(4): 237-248.
Lourenço, R., Penteriani, V., Rabaça, J.E. & Korpimäki, E. 2014: Lethal interactions among vertebrate top predators: a review of concepts, assumptions and terminology. Biological Reviews 89: 270-283.

Love, J. 2006. Sea Eagles: Naturally Scottish. Scottish Natural Heritage, Perth.

Mackrill, T.R., Appleton, T.P. and McIntyre, H. 2013. The Rutland Water Ospreys. Bloomsbury, London.

Manchester, S.J. and Bullock, J.M. 2000. The impacts of non-native species on UK biodiversity and the effectiveness of control. Journal of Applied Ecology 37: 845-864.

Mammal Society. 2021. The Brown Hare.

Marinov, M., Dorosencu, A., Alexe, V., Bolboaca, L.E., Kiss, J.B., Nanu, C., Tosic, K. and Tudor, M., 2019. Recent data regarding colonial waterbirds in Danube Delta Biosphere Reserve (Romania). Journal of Environmental Protection and Ecology 1: 276-284.

Marquiss, M. & Madders, M. & Carss, D. N. 2003. Diet of Breeding White-tailed Eagles in Scotland, particularly on the Island of Mull 2002. Report to SNH, on contract IB020303T, March 2003. 24pp

Marquiss, M., Madders, M., Irvine, J. and Carss, D.N. 2004. The Impact of White-tailed Eagles on Sheep Farming on Mull. Report to SNH, on contract ITE/004/99. 48pp.

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. 2017. Bird Trends 2017: Trends in Numbers, Breeding Success and Survival for UK Breeding Birds. Research Report 704. BTO, Thetford. www.bto.org/birdtrends

Massimino, D., Woodward, I.D., Hammond, M.J., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Barimore, C., Dadam, D., Eglington, S.M., Marchant, J.H., Sullivan, M.J.P., Baillie, S.R. & Robinson, R.A. 2019 BirdTrends 2019: Trends in Numbers, Breeding Success and Survival for UK Breeding Birds. BTO Research Report 722. BTO, Thetford. www.bto.org/birdtrends

Mebs, T. & Schmidt, D. 2006: Die Greifvögel Europas, Nordafrikas und Vorderasiens: Biologie, Kennzei- chen, Bestände. Kosmos, Stuttgart. (In German)

Mee, A. 2017. Irish White-tailed Sea Eagle Reintroduction Project Report 2017. Golden Eagle Trust.

Mee, A., Breen, D., Clarke, D., Heardman, C., Lyden, J., McMahon, F., O'Sullivan, P., O'Toole, L. 2016. Reintroduction of White-tailed Eagles Haliaeetus albicilla to Ireland. Irish Birds 10: 301-314.

Mee, A. 2020. Irish WTSE Reintroduction Project Summary 2020. Report to UK White-tailed Eagle Project Team annual meeting.

Mitchell, C., Hearn, R. and Stroud, D. 2012. British Birds 105: 498–505

Mlíkovský, J. 2009. The food of the white-tailed sea eagle (Haliaeetus albicilla) at Lake Baikal, East Siberia. Slovak Raptor Journal 3: 35–39.

Mizera, T., Szymkiewicz, M. 1991. Trends, status and management of the White-tailed Sea Eagle Haliaeetus albicilla in Poland, Birds of Prey Bulletin No 4.

Mrugasiewicz A. 1984. Bielik Haliaeetus albicilla w dolinie Baryczy. Dol. Baryczy 3: 1-27.

Mizera T. 1999. Bielik. Lubuski Klub Przyrodników, Świebodzin.
Molloy, D, 2011. Wildlife at work. The economic impact of white-tailed eagles on the Isle of Mull. The RSPB, Sandy.

Nadjafzadeh, M., Voigt, C.C., and Krone, O. 2015. Spatial, seasonal and individual variation in the diet of White-tailed Eagles Haliaeetus albicilla assessed using stable isotope ratios. Ibis 158(1): 1-15.

Nadjafzadeh, M., Hofer, H. and Krone, O. 2016. Sit-and-wait for large prey: foraging strategy and prey choice of White-tailed Eagles. 157: 165–178

National Trust. 2020. Grey seals on Blakeney Point.

NatureScot. 2020. White-tailed Eagle Action Plan Review 2020.

Neumann, J. & Schwarz, J. 2017: Seeadlerpaar mit beson- derer Vorliebe für junge Mäusebussarde. Teil 3. Großvogelschutz im Wald (Jahresberichte 2017): 28-30. (In German).

Norfolk & Norwich Naturalists' Society. 2017. Mammals of Norfolk.

Nygård, T., Halley, D. and Mee, A. 2009. The reintroduction of the white-tailed eagle to Ireland. Project report 2009.

Öst M, Lindén A, Karell P, Ramula S, Kilpi M (2018) To breed or not to breed: drivers of intermittent breeding in a seabird under increasing predation risk and male bias. Oecologia 188: 129- 138

Oudman, T., de Goeij, P., Piersma, T. and Lok, T., 2017. Colony-breeding eurasian spoonbills in the Netherlands: local limits to population growth with expansion into new areas. Ardea 105(2): 113-124.

Palomares, F., Delibes, M., Revilla, E., Calzada, J. & Fedriani, J.M. 2001. Spatial ecology of Iberian lynx and abundance of European rabbits in southwestern Spain. Wildlife Monographs, 148, 1–36.
Rajchard, J., Procházka, J., Šmahel, L. 2010. Nest sites and reproductive success of a restored population of White-tailed Eagles in the Czech Republic. J Rapt Res 44: 243–246.

Radović, A., Mikuska, T. 2009. Population size, distribution and habitat selection of the white-tailed eagle Haliaeetus albicilla in the alluvial wetlands of Croatia. Biologia 64: 156–164.

Ranwell, D.S. 1972. Newborough Warren, Anglesey. III. Changes in the vegetation on parts of the dune system after the loss of rabbits by myxomatosis. Journal of Ecology, 48: 385–395.

Rayment, M., Lewis, P., Henderson, R. and Broom, G., 2000. Valuing Norfolk's Coast: The Economic Benefits of Environmental and Wildlife Tourism. RSPB Publication.

van Rijn, S.V., Zijlstra, M. and Bijlsma, R.G. 2010. Wintering white-tailed eagles Haliaeetus albicilla in The Netherlands: aspects of habitat scale and quality. Ardea 98: 373–382.

Van Rijn, S.H.M. and J.J.A. Dekker 2016. Zeearenden in Nederland. Een kennisoverzicht van de verzamelde gegevens tot en met 2016. Rapport 2016-03.

Ross-Smith, V.H., Calbrade, N.A. & Austin, G.E. 2011. Analysis of Wetland Bird Survey (WeBS) Data for the Wash SSSI/NNR. Research Report no. 587.

RSPB 2008 https://ww2.rspb.org.uk/our-work/rspb-news/news/details.aspx?id=tcm:9-202977

RSPB 2016 https://community.rspb.org.uk/ourwork/b/eastscotlandeagles/posts/the-fate-of-quot-14white-a-quot

Rayment, M., and Lewis, P. et al. 2000. Valuing Norfolk's Coast: The Economic Benefits of Environmental and Wildlife Tourism. Sandy, Royal Society for the Protection of Birds.

Russell, D.J.F., Morris, C.D., Duck, C.D., Thompson, D. and Hiby, L. 2019. Monitoring long-term changes in UK grey seal pup production. Aquatic Conserv: Mar Freshw Ecosyst. 29(S1):24–39. https://doi.org/10.1002/aqc.3100

Sándor, D., Alexe, V., Marinov, M., Doroşencu, A., Domşa, C. & Kiss, B. 2015. Nest-site selection, breeding success, and diet of white-tailed eagles (Haliaeetus albicilla) in the Danube Delta, Romania. Turkish Journal of Zoology 39: 300–307.

Salo, P., Nordström, M., Thomson, R.L., and Korpimäki, E. 2008. Risk induced by a native top predator reduces alien mink movements. Journal of Animal Ecology 2008, 77, 1092–1098.

Sergio, F., Newton, I., Marchesi, L. and Pedrini, P. 2006. Ecologically justified charisma: preservation of top predators delivers biodiversity conservation. Journal of Applied Ecology 43: 1049-1055. doi:10.1111/j.1365-2664.2006.01218.x

Simberloff, D. 1998. Flagships, umbrellas, and keystones: Is single-species management passé in the landscape era? Biological Conservation 83(3): 247-257.

Simms, I. C., Ormston, C.M., Somerwill, K. E., Cairns C.L., Tobin, F.R., Judge. J. & Tomlinson, A. 2010. A pilot study into sea eagle predation on lambs in the Gairloch area - Final Report. Scottish Natural Heritage Commissioned Report No.370.

Stanbury, A. and UK Crane Working Group. 2011. The changing status of the Common Crane in the UK. British Birds 104: 432–447

Sulkava, S., Tornberg, R. and Koivusaari, J. 1997. Diet of the white-tailed eagle Haliaeetus albicilla in Finland. Ornis Fenn 74: 65–78.

Thomson, J.M., 1986. Mugilidae. p. 344-349. In J. Daget, J.-P. Gosse and D.F.E. Thys van den Audenaerde (eds.) Check-list of the freshwater fishes of Africa (CLOFFA). ISNB, Brussels, MRAC; Tervuren; and ORSTOM, Paris. Vol. 2.

Thompson, D., Duck, C. D., Morris, C. D., and Russell, D. J. F. 2019. The status of harbour seals (Phoca vitulina) in the UK. Aquatic Conservation: Marine and Freshwater Ecosystems, 29(S1), 40– 60. https://doi.org/10.1002/aqc.3110

Tulloch, A.I.T., Nicol, S. and Bunnefeld, N. 2017. Quantifying the expected value of uncertain management choices for over-abundant Greylag Geese. Biological Conservation 214: 147-155

Walls, S and Kenward, R. 2020. The Common Buzzard. Bloomsbury, London.

Watson, J.W., Garrett, M.G. and Anthony, R.G., 1991. Foraging Ecology of Bald Eagles in the Columbia River Estuary. The Journal of Wildlife Management 492-499.

Whitfield, D.P., Douse, A., Evans, R.J., Grant, J., Love, J., McLeod, D.R.A., Reid, R. Wilson, J.D. 2009 Natal and breeding dispersal in a reintroduced population of White-tailed Eagles Haliaeetusalbicilla , Bird Study 56(2): 177-186.

Whitfield, D.P., Marquiss, M., Reid, R., Grant, J., Tingay, R. and Evans, R.J. 2013 Breeding season diets of sympatric White-tailed Eagles and Golden Eagles in Scotland: no evidence for competitive effects. Bird Study 60(1): 67-76.

Wille, F. and Kampp, K. 1983. Food of the white-tailed eagle Haliaeetus albicilla in Greenland. Holarctic Ecology 6: 81–88.

Yalden, D.W. 2007. The older history of the White-tailed Eagle in Britain. British Birds 100: 471–480

Visit Great Britain. 2020. The GB Tourist Annual Report 2019.

Visit Norfolk. 2020. Economic Impact of Tourism 2019 Results.

Vrezec, A., Bordjan, D., Perušek, M., Hudoklin, A. 2009. Population and ecology of the White-tailed Eagle (Haliaeetus albicilla) and its conservation status in Slovenia. Denisia 27: 103–114.

Appendix 1 - White-tailed Eagle reintroduction and translocation - Advice Note

Wester Ross Sea Eagles

Location and design of release cages

Collecting, rearing & release techniques

Roy Dennis MBE

White-tailed eagle reintroduction and translocation; location and design of release cages; collecting, rearing & release techniques

This advice note has been compiled to help persons or groups contemplating raptor translocation and release. We have gained a great amount of expert knowledge and experience over the last five decades. Many people have been involved but I particularly value the ideas and experience of John Love, Colin Crooke, Allan Mee and Lorcan O'Toole.

Location

One of the most important features for the successful translocation of young white-tailed eagles is the selection of an optimum release area. Initially, there is the choice of a region or country for the re-establishment of a breeding population of the species, and then the local choice for the best release (hacking) site within that region. The latter is covered in this information note.

In my opinion, the design of the release cages and the location at Loch Maree, in Wester Ross, during the release of the young sea eagles in the early 1990s, was close to being ideal. The main aim is to release successfully all of the translocated young and to encourage ALL of them to remain close to the release cages for several months or more, so that they can forage on plentiful carrion at a feeding location, and become 'hefted' on the locality. The project staff provide plentiful supplies of food to emulate very efficient surrogate parents.

\

Loch Maree release cages

The cages should look out over good habitat. Ideally, they should have a good view of the sky and the horizon, the outline of hills and the location of woods, lakes, rivers, estuaries or open coast. This allows them to observe the local surroundings, the activities of local wildlife as well as the transit of the sun and the movement of stars in the night sky. The cages should be built on a piece of flat ground, but it is

advantageous if the cages are located on an open wooded hillside to give the birds better views, and, later, better flying opportunities. In front of the cages, the birds should be able to look out at old trees, live or dead, with large branches suitable for perching. The trees can be solitary or in groups of very big trees with open branches ideal for the young to fly to and perch, when they make their first hesitant flights from the release cages, and easy for them to return to after making more sustained flights.

In the first week of flying the birds are very inexperienced and can make clumsy landings. It is important that the release cages are not situated near 'closed-in' woodland, especially thick young woodlands or plantations. Native trees with soft foliage, such as willows, birches, poplars, and young conifers such as spruces and firs, do not have strong top branches. Adults do not land in such places, but if inexperienced young birds try to land on them, they fall down through the foliage and then find it extremely difficult or even impossible to regain flight. Then their only way to find an open space to fly is to walk out of the wood and this may be difficult. In some cases, birds could die before getting to an open area to regain flight. Do not, therefore, site cages close to young plantations or woods, or for that matter dense reed beds, or growing crops such as cereals.

It is very important that the people in charge of the release project can view the cages and release site, especially at and after the release, from a long distance with a telescope or binoculars. This distance must be sufficient to have no influence on the behaviour of the birds. Ideally, post-release viewing should take place from the opposite side of a valley from the cages or from hidden hides. In this way, it is possible to see how each individual carries out its first flights and its ability to return to the cages. It is very important that the actual release can take place under the birds own volition and that they are not scared out of or away from the cages.

The other important aspect of location is that there should be a really good open area, of at least a hectare, in front of the release cages or close to it, surrounded partly or wholly by large trees, which will become the main feeding place during the subsequent months. Ideally this should be visible while the birds are in the cages, so that some carrion food can be placed there, during night time, for a couple of days prior to the release, allowing them to see corvids and buzzards, for example, flying down to feed.

Viewing feeding area, Loch Maree

If possible, the area in front of the cages should have a range of perches and several 'nest type' structures on which food can be placed at night.

Construction of the release cages

The cages built at Loch Maree in Wester Ross for the release of the sea eagles, and subsequently the same design used at the Irish release site in 2007 and on the Isle of Wight in 2019, are as good as you can get for this sort of project. Each cage should be able to house up to three individual young sea eagles. It is better for the birds to be reared in broods rather than singly.

The cages should be built in the following way. The dimensions of each cage are 12 feet (ca 4 metres) by 12 feet (ca 4 metres); the height is 8 feet (2.7 metres). Ideally, the cages are built in a row. The back of the cage is completely wooded, either strandboard or plywood, so that all activities involving the people feeding the birds and caring for them prior to release takes place behind the cages. It is very important that the birds do not see people while they are in the cages.

Checking eaglets through viewing holes

The side walls of each cage should be similar strandboard or plywood to the full height of the cage, so that birds in one cage cannot see the birds in the next cage. Each cage and brood is a separate unit. Firstly, it is allows birds in one cage to be caught for ringing, satellite tagging, etc., without the birds in the other cages being disturbed in the process. Secondly, it replicates the wild situation as there are almost certainly added advantages in that after release the three young in one brood get to know new individuals as each new brood is released. This could be beneficial in the process of building relationships, and selecting potential mates, in the future.

The front of the cage should be covered with weld mesh; either plastic coated steel mesh or strong plastic mesh, approximately one inch (2.5 cms) diameter. The mesh should be smaller rather than larger, to prevent damage to the young, especially the cere or flight feathers, when they fly against it. The top of the cage should be covered in similar mesh, but the area over the artificial nest and the back of the cage should be covered with a strip of strandboard or plywood about 4 feet (one+ metre) wide to shelter from heavy rain. But it is important that some rain can blow in on the birds so that they occasionally get wet, which is useful for cleaning and preening their plumage.

The Isle of Wight release cages

This cage system works best when two cages are operated together with a ‘closed-lock’ system between the two cages, an external door opening into a small chamber 3 feet by 3 feet (one metre by one metre), which then has a door in each side leading into each individual cage. When it is necessary to enter the cages, the operator opens the outside door, climbs into the small chamber then closes the outside door before opening the door into the individual cage to gain access. This system prevents escapes and the small chamber has another advantage, allowing a person standing there to check the birds, without being seen, through small holes drilled through the wood. Similar drilled holes in the back wall allow other views to check on the chicks and their feeding progress.

In the back corner, opposite the door, a nest platform is built at half the height of the wall, about 1.5 metres from the floor level. It is a strong wooden platform about 1.2 metres square or hexagonal, with a 15 cm high board running around the outside of the nest. A nest is built on this platform; not a stick nest but a replica of the interior of a wild nest at the time when big chicks are present. So it is covered with soft material such as moss, straw, dried grass, wood chips and leaf mould to create a flat platform on which the young birds can walk around and feed.

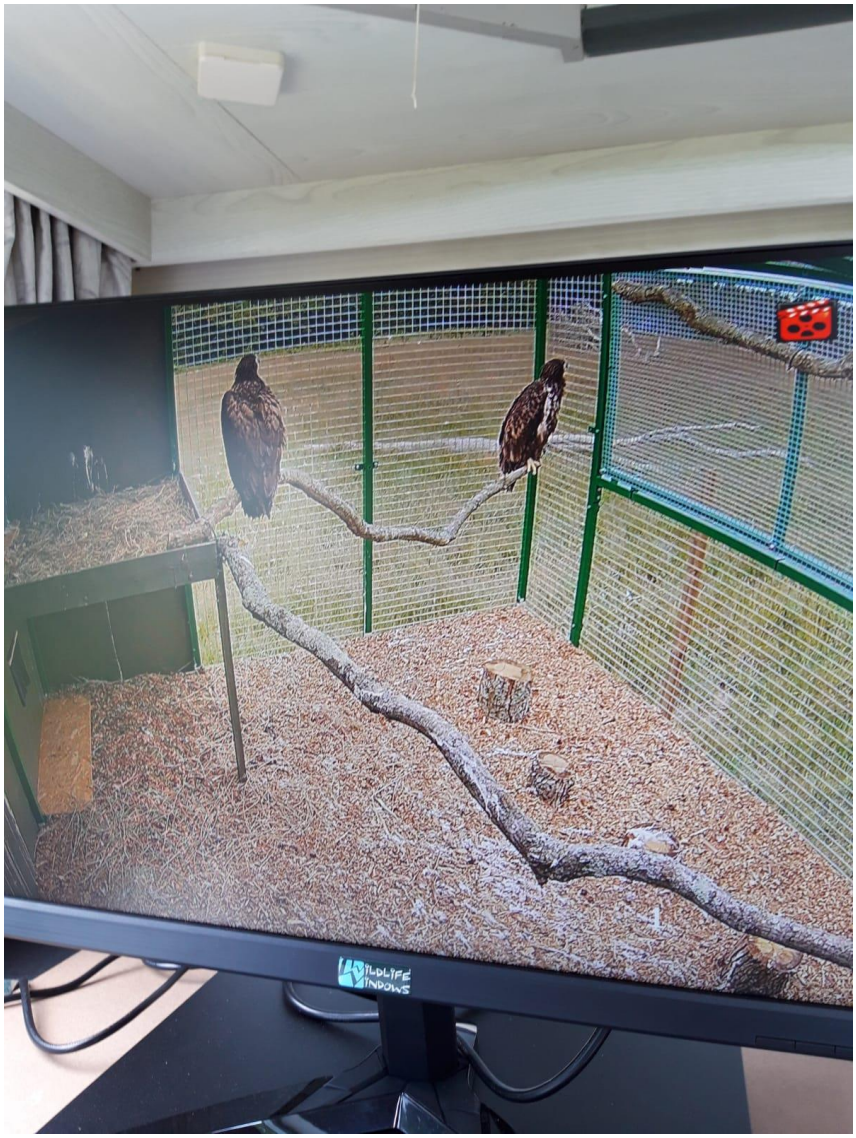
Closed lock system - Killarney

Young sea eagles in nest on Isle of Wight

Just above this platform, make a hole in the back wall of the cage to put food in the nest. About 9 in (22cms) square, it has a lockable swing hatch on the outside, and on the inside is nailed a sleeve, made from the leg of a pair of trousers or a heavy shirt, so that chopped up food, such as rabbit, fish and other meat, can be pushed through the hole to land on the nest. The birds can grab food and feed themselves. At convenient places in the back wall of the cage, drill small holes which are convenient for watching the birds, without being seen.

A miniature CCTV system should be installed in each cage to monitor the young on the ‘nest platforms’. This system is linked by a cable back to a caravan or hut out of

sight of the cages. A continuous recording of each brood is maintained for subsequent checking.



Monitoring Isle of Wight birds by CCTV

A clean branch of a tree is nailed onto the outer edge of the nest and out across to the far corner of the cage so that the young can branch when they are ready. Another branch crosses from corner to corner of the cage so that there is a network of perches for the birds to use. The floor of the cage is left open and free of vegetation. There should be no 45 degree supports within the cage to hold the roof; birds can get wings caught in them. The front of the cage should have a large mesh door, which can be opened to release the birds. It should be locked until release day. The door should be lowered slowly from the back of the cage using a long string, without the birds seeing the person who is operating the cage opening.

In some circumstance, where birds are being released in areas with people in the general countryside, it may be worth instigating a procedure to habituate the birds to people at safe distances. Staff should occasionally walk across the field of view of

the birds at right angles, about 400 metres distant. Do not walk towards the birds. In this way, the young can occasionally see people walking in a non-threatening situation. No one should be allowed to walk around the front of the cages while the birds are in captivity and no attempt should be made to tame the birds in any way, or to habituate them to humans. The area around the cages should be kept as quiet as possible, including no noise or loud talking.

Collection and care of young.

Birds should be collected from their nests in as short a time as possible, preferably three to four days at a maximum, so that they are in temporary accommodation for the shortest time possible. They should be of the right age, about two-thirds grown, so they are big enough to regulate their own body heat and mature enough to be able to pick up and eat food placed in front of them. Only chicks in perfect condition should be taken: runts and birds with obvious problems, such as broken feathers, prominent fault bars, etc should not be collected. Each bird should be ringed and colour ringed so that a record of its progress throughout and after the reintroduction can be maintained. After collection, birds should be housed in an artificial nest situation in secluded sheds or a building which has plenty of light from the sky. Temporary partitions, 3 feet (1 metre) high, can be nailed to create small nest areas for 3 birds. The floor is covered with straw, grass, etc. Pieces of wooden board like large wooden dinner plates are laid on the straw, so that cut up food can be placed in each compartment without becoming unnecessarily soiled. The birds should be left alone with plenty of food (fish and meat) so that they can feed when left alone. Once one starts, the others will follow.

In some cases, where a chick will not feed, the best thing to do is to cut the food into small pieces, small golf ball sized, and artificially feed it by holding the mouth open and placing the food in the back of the throat. Dipping it in water helps. Carry on until the crop is about the size of an orange or large apple. This is also the best time for a vet to take blood and saliva samples, for veterinary checking and for subsequent DNA and sexing analyses.

Once the full collection is complete, the birds should be transferred to the release location as fast as possible. There are advantages in travelling at night, but they are robust and travel well, even country to country by plane is not a problem. The best option is being able to travel with the birds, and in that case large cardboard boxes, with air holes, give the best travelling conditions. On public transport, including aircraft, the travelling cages must adhere to regulations. Plastic flight cages for dogs are suitable, but lightweight and breathable sacking should be taped over the open mesh ends so that people are not visible. Birds need feeding before transport, with wet fresh fish, but do not need feeding en route.

Once the birds have reached the release cages, each bird should be judged by someone with expertise and batched into broods of three of similar size, starting with the biggest, so that cages hold similar aged young. In this way, older birds can be released together and a cage or two of younger birds held back for a week or more until ready for release. The birds are placed in the nest with a large amount of food on the wooden feeding plates, which are placed around the edge of the nest so that

each bird can feed. From then on, food is pushed through the feeding sleeve, morning and evening.

In the first few days it is important that the birds are monitored carefully by checking the CCTVs and footage to check that each bird is feeding well in each cage. Very quickly they will all feed easily and then it is a matter of making certain they have plenty of food. It is impossible to over feed them and the aim is be super efficient parents by providing the young with as much food as possible. There is no need to reduce the food as the birds get near to fledging, but once their main growth of bones and body is complete, and the main flight feathers are fully grown, they will eat less food themselves. Body weight naturally declines just before fledging.

They will start to fly from perch to perch, after much wing flapping. They can be very busy flapping against the netting of the cage and this can look very stressful. Do not worry too much that they will damage their feathers. After a couple of days they will quieten down and then perch looking out of the cage watching everything that is going on. Ideally it is best to keep the young eagles about a week past normal fledging time and then they are ready to release. On the day or so before release, the birds are caught up to be measured and weighed, satellite transmitters are fitted and they are checked to see that each is perfect for release. Start putting carrion on the future feeding sites in front of the cages so that birds in the cages get used to seeing other carrion feeders flying to and fro.

Full grown ready for release through viewing hole

The release requires a nice day, preferably with light winds. Delay release if it is raining or there are strong winds. Ideally, cage fronts should be lowered gently pre-dawn so that each bird can make its own decision to leave the confines of the release cage. Observers should be on station at suitable viewpoints with a telescope and binoculars, so that a full record of each bird's behaviour is noted. There should be no one anywhere near the cages or visible close to them at this crucial stage.

Birds may emerge quickly or they may take an hour or more to fly. If a bird has not left by evening, the door should be pulled shut for the night to protect it from

predators. Do not chase it out. The next day the release can continue. Once in the air birds may make extended flights or just fly for several minutes and land on perches in the field or in nearby trees. Birds will not re-enter cages, but may return to the top of the cages, and food can be placed on top of the cages in the first week.

A juvenile leaving the pens on the Isle of Wight

Post release

The most important thing post release is to have the young birds coming to a regular food supply. Young sea eagles are provided with food by their parents for several months or more in the wild. In a translocation project, the longer the birds stay around the release site and receive plentiful food at a feeding site, the greater the survival rate in the first autumn and winter of life. Birds which fail to stay close to the release site or get frightened away in the first few days are more likely to have problems finding sufficient food. Remember, even in the wild most mortality occurs in the first year. Translocated birds are exceptionally valuable to a project so every effort must be made to increase survival in any way possible.

After release, food should be deposited at the feeding site during the hours of darkness to avoid frightening them. Food can be placed on the ground but it is then subject to consumption by ground predators, such as red fox. Large flat rocks, each the size of a kitchen table, are ideal for placing food, but it is possible to build feeding platforms in the middle of the open feeding area. Made from wood, 6 feet by 6 feet (2 metres by 2 metres) and more than four feet (1.5 metres) high, covered with an old carpet or artificial grass material, this keeps the food off the ground. The birds will fly to these places to feed or take chunks of food back into the trees to feed.

This is the time to put out as much food you can supply. Each bird requires several kilograms per day. Rabbits, fish and fish off-cuts, dead deer, offal, road kills are all important food. Initially it is best to continue putting out food at night, but later, once

the birds really know the feeding area, it is ideal if you can drive to the feeding site and take food out of the vehicle, which causes less disturbance than delivery by foot. Later in the winter it is possible to reduce feeding to every other day or sometimes more, but just put out more carrion on each visit. Remember the longer the birds stay at these feeding sites, the greater their survival. Young sea eagles will certainly locate their own food but the feeding site is very important. You will not make the birds lazy or lacking in ability. Sea eagles are social birds and are used to living in flocks, and there are almost certainly advantages, at these gatherings, to gain social skills and to choose future partners. The feeding area should be maintained throughout the whole winter up until March or April when one will notice a decline of use.

Five young White-tailed Eagles feeding on an elevated feeding table on the Isle of Wight after release

Appendix 2 - White-tailed Eagle study visit to the Netherlands
25th-27th October 2018

Roy Dennis & Dr Tim Mackrill

We visited the Isle of Wight and met whole range of people, including the NFU at Newport, between the 25th - 27th of September 2018 to explore the potential for reintroducing white-tailed eagles to the island. I decided that it would be extremely useful to visit the Netherlands to discuss with the experts there the habits and habitats of the new breeding population of white-tailed eagles.

I got in touch with one of the country's leading raptor specialists, Paul Voskamp (Ecologist with Limburg Provincial Government), who I had previously met in relation to eagle owls and the satellite tracking of migratory hen harriers. I explained to Paul that we were particularly interested in the relationship between the white-tailed eagles and the farming community, and whether there had been any complaints of them attacking livestock. He didn't understand my question because it was not in his mind because nothing of the sort had happened at in the Netherlands. Paul works for the Limburg local authority on wildlife matters and so is fully up to speed on wildlife issues. He said he would be pleased organise a rapid field trip for us to the white-tailed eagle breeding areas and meet members of the Dutch white-tailed eagle working group. So it was arranged that Tim and I would meet Paul on the afternoon of 25th of October.

We were collected at Schiphol airport by Paul Voskamp and he drove us southwest to the most southerly breeding pairs of white-tailed eagles in Zeeland. We stayed the night in a small hotel in the coastal village of Oude-Tonge. By this time we were well up to speed on the situation regarding white-tailed eagles in the country. After many years of birds wintering and numbers increasing, principally at Oostvaardensplassen north of Amsterdam, a pair of bred there in 2006. The population then rose slowly and in 2018 there were 18 territorial pairs of which 11 pairs bred. We learned so much more that evening over dinner.

On the morning of the 26th we were collected by Dirk van Straalen, who is a project biologist with Delta Milieu in Zeeland. He is a member of the white-tailed eagle working group and an expert ornithologist. We drove across the farmlands to the island dyke and then along a private road following the dyke and looking across Krammer-Volkerak, This was originally an inlet of the sea which has been cut off from the North Sea by a big dyke and is now basically freshwater; it is now an EU Nature 2000 site. There were very large numbers of waterbirds, surface feeding and diving ducks, as well as coots and grebes. At the east end we saw an adult and juvenile white-tailed eagle put up the ducks as they flew over them before returning to the wooded island where they perched in the trees. Within 10 minutes of landing back in the willow/poplar trees the water birds had settled back on the water. Dirk pointed out the nest to us, where this pair, in 2018, reared the first young for Zeeland. After returning to the village for our car, we followed Dirk to the main road, which held a lock for the passage of barges and boats, and a line of wind turbines. From here we could see the nest from the other direction and noted that the adult female was roosting in a tree not far from the nest. Small flocks of brent geese were flying in and out from the sea to wash and to drink.

White-tailed eagle nest at left; adult to right. Krammer-Volkerak

We drove on towards Dordrecht where Dirk showed us another nesting area; it was in a reserve which was being grazed by Heck cattle. The nest tree was in a tree inside an island and not visible from the road. We saw no sign of the eagles but did briefly see a rough-legged buzzard which dropped down on prey the other side of the nest wood. We left Dirk and drove to the famous Biesbosch nature reserve. I had been here before in the 1990s to see the then recently reintroduced beavers. The eagles had bred here for the last five years, mostly with annual success. On the way through the reserve there is a very nice display board featuring the species beside the public roadside. While there we also viewed the osprey nest site which was the first for the Netherlands. We also saw good numbers of greylag geese, ducks and lapwings with great white egret present across the countryside.

Our next area was north of Amsterdam and so we drove on the main roads to meet Stef van Rijk, who is also a project biologist with Delta Milieu working on wildlife monitoring, and leader of the white-tailed eagle working group. We caught up with Stef just north of Huizen and very quickly he showed us an eagle nesting site very close to the main bridge. We drove along the minor road on the dyke and looked at the wooded island where the nest is situated in a tree, but it is not visible. Between the dyke and the island is a navigable channel for shipping, including barges. The nest was about 850 m from the road, 3 kms from the local town, and just 20 kms to Amsterdam.

White-tailed Eagle road sign at the Biesbosch Nature Reserve

Next we crossed the polder so that we could view Oostvaardensplassen from the raised viewpoint above the major rail mainline to Amsterdam. The area had changed quite dramatically in the decade or so that I had last been there and most of the trees were now dead and fallen. We could see some herds of red deer, Konik ponies and Heck cattle. There were also some big flocks of barnacle geese. Out in the reed bed areas we could see the white-tailed eagle eyrie in a willow tree. This was the site of the first nest in the Netherlands in 2006, and had been used regularly since. We drove round by Lelystad and along the main road between the big reserve and the open Markermeer. At one of the roadside viewpoints we could look across the marshes to the nest from a different angle and could see one of the eagles perched near it. Again there are very large numbers of waterbirds, including a couple big flocks of tufted ducks.

Tufted duck flock at Oostvaardensplassen

Finally that day we drove through Lelystad and out on the main road on the dyke which separates the Markermeer from the Ijsselmeer. We viewed the newly created islands which are being constructed from dredged material as secluded nature reserves. As dusk came we headed inland to Radio Kootwijk in the Veluwe forest where we all stayed overnight with Dr Hugh Jansman, a research ecologist with Wageningen University. Again we were able to talk over dinner about our day and the history and behaviour of white-tailed eagles in the Netherlands to compare with the situation in the UK, and particularly with the Isle of Wight and the south of England.

On 27th of October it was a much better day weather-wise and Paul drove us across country to Zwolle; where Paul, Stef and Hugh started their birding careers as teenagers. Near Kampen, we passed through typical Dutch rich farmland to a tower hide which overlooked the nature reserve. One adult eagle was flying as we approached and very quickly we could see the big nest in a willow on the island. It was another area with lots of ducks, coots, great crested grebes and greylag geese, with some of the geese grazing on the polder in winter cereal fields. This breeding site is 700 m from the local road, 500 m from farmland and 2.5 km to the nearest town. We then drove across the polder to the main road for our return to Amsterdam airport.

Breeding location on reserve within 500 metres of farmland near Kampen

The first pair of white-tailed eagles bred at Oostvaardensplassen in 2006. This State Forest reserve was created when one of the polders failed to drain properly and it was chosen as a special site to allow ecological processes to continue naturally in the presence of large grazing animals. Heck cattle to replicate the original aurochs, Konik ponies from Poland and red deer were released in the reserve. This resulted in dramatic ecological changes over the decades. White-tailed eagles started to visit this area regularly in winter nearly 50 years ago and from the 1990s were attracted to carcasses of large herbivores which had died in the reserve. Since 2006 a pair have always nested there and were the forerunner of the recovery, with in 2018 over 18 pairs on territory in the Netherlands, a distance of about 250 kms from near Groningen in the north to Zeeland in the south.

Conclusions. We had some questions before our visit which we were eager to explore with the Dutch white-tailed eagle experts.

1. Their presence in a human dominated landscape. In the UK most people think of the white-tailed eagle as a species of the wild regions of the northwest highlands and islands of Scotland. A species which is shy and needs quiet areas in which to live and breed. They generally cannot envisage them living again in the populated areas of the UK. Our field visit showed the ability of the white-tailed eagle, when it is not persecuted, to live in landscapes of farmland, villages, towns and even cities in the background, along with motorways and the general bustle of humanity as long as there is sufficient wild food and suitable nesting places in quieter areas. The distances of nest sites from busy activity can be as little as 500 metres. This

behaviour is similar in Germany and Poland. In consequence places in our country, like the Isle of Wight are certainly potential future breeding sites.

Large barge passing behind white-tailed eagle nest – a daily occurrence

2. Potential conflict with farming. Following our discussions with the NFU on the island and with individual farmers, some had serious and understandable concerns that any reintroduced white-tailed eagles would kill lambs on the island. The Irish reintroduction of white-tailed eagles was met with hostility from sheep farmers, because they had heard about the problems in the western highlands and islands of Scotland. Ten years after the reintroduction in Co Kerry, no lambs have been killed and now the Irish farmers are either neutral or positive towards the eagles.

In the Netherlands there has been no conflict with livestock farming. We understand there are about half a million sheep in the Netherlands; many are kept in flocks on the farms while others graze the dykes to maintain a low vegetation for dyke protection. We saw good numbers of sheep as we drove across the countryside; and in several areas we saw free range hen farms for egg production. Several of the nesting sites we visited were within a half a kilometre of intensively farmed land. Paul Voskamp works for the local government and is involved in resolving wildlife conflicts with land users, including farming. At the present time this involves wild boar. But he has never come across or been made aware of agricultural conflicts with white-tailed eagle. Following this visit we consider that the farming situation on the Isle of Wight is closely comparable to the Netherlands and adjacent countries than to western Scotland. The Irish experience is also important in trying to allay the fears of the island's sheep farmers. We do recognise the apprehensions of the Isle of Wight farmers and have written to the NFU in Newport to say that we wish to maintain dialogue and if the project went ahead we would wish them to be a key member of any steering group.

3. Disturbance to wildlife. On several occasions we have been questioned about the disturbance and damage that white-tailed eagles might do to wintering populations of waterfowl and waders and to breeding colonies of terns and rare breeding species such as Mediterranean gulls. They said that in the worst case scenario they might frighten them away. We discussed this with the Dutch

ornithologists where white-tailed eagles in the Netherlands principally hunt waterfowl such as ducks, coot, grebes, young geese, a range of fish and carrion. Because of the large numbers of water birds present in the Dutch wetlands, they said that the hunting range of individual eagles is often very small – no more than a kilometre or two. In fact their nests are often close to the main resting and feeding areas of waterfowl. As regards general disturbance, these ornithologists thought that it was no different to that caused by, for example peregrine falcons, and that the bird flocks just get used to the presence of white-tailed eagles. They probably recognise when the eagles are hunting rather than moving location. The waterfowl fly up or scatter when they think they are at risk and then settle back down on the water, in much the same places, once the danger has passed. It is important to note that white-tailed eagles spend much of the day perched in a tree in these habitats. In fact on the day we were there a hunting goshawk can cause as much disturbance.

We also discussed with them the potential risk of disturbance to breeding concentrations of nesting birds. We were told that the breeding colonies, for example Mediterranean gulls and breeding terns, were very effective at ‘swarming’ out to drive off any approaching white-tailed eagle. With breeding waders, such as black tailed godwits, the off-duty bird was effective at chasing white-tailed eagles away from the nesting sites of their mates. The general attitude of the Dutch experts was that nearly all these species evolved with white-tailed eagles as neighbours so the species was part of their ecosystem. Additionally, many of the birds that winter around the Isle of Wight will have known the species in their summer breeding grounds or on migration, so will be well aware of the hunting ability of white-tailed eagles.

3 December 2018

Appendix 3 - Monitoring and Evaluation Plan

February 2021

Ken Hill White-tailed Eagle Project
Monitoring and Evaluation Plan
Version: 1

Contents

1. Background and purpose of Monitoring and Evaluation Plan

In February 2021 the Roy Dennis Wildlife Foundation and Ken Hill Estate applied for a licence to begin a ten-year project to release up to 60 juvenile White-tailed Eagles *Haliaetus albicilla* in West Norfolk. The project aims to re-establish a breeding population of the species in eastern England, as set out in the project feasibility report (Mackrill et al. 2021).

A key component of the project is ongoing monitoring of the reintroduced population, interactions with local biodiversity, the associated socio-economic impact of the reintroduction and evaluation of the project against objectives. This plan sets out the key monitoring and research areas which will be coordinated by the project team and overseen by the project's Monitoring and Evaluation Group. This group will comprise representatives from a broad range of local stakeholders, as well as academic partners and has an independent chair.

Different areas of work will be prioritised and some may only become possible as additional resources become available. Initial priorities will be to monitor the welfare and survival of the released eagles; assess the impact of eagles, and specifically eagle watchers, on protected sites including SPA, SAC, SSSI interest features, and to monitor any impacts on livestock, poultry, game and fisheries. The Monitoring and Evaluation Group will regularly review these priorities and associated progress, and, if necessary, adapt the plan should new requirements for monitoring and research become apparent. Any changes will be agreed in advance with Natural England, and the plan will be updated with progress against the different objectives on an annual basis. The plan is linked to the project's Risk Management Strategy and Visitor Management Strategy to ensure robust and rigorous scientific monitoring of all elements of the project and its associated biological and socio-economic impact.

There is potential for PhD as well as MSc and BSc projects to be undertaken within the framework set-out by this plan, and discussions are ongoing with several academic institutions. However there is sufficient capacity for the core monitoring to be undertaken by the project team.

The key objectives of ongoing monitoring and research, as set out in the project's feasibility report are as follows:

- White-tailed Eagle ecology, including habitat use, ranging behaviour, diet and survival in the study area;
- Interactions with other components of local biodiversity, protected sites and species, including features of protected sites including Natura 2000 sites, e.g. birds on SPAs;
- Impact of eagle watchers on protected sites including SPA, SAC, SSSI interest features and monitoring of the success of any mitigation measures implemented;
- Evaluation and mitigation of direct and indirect, potential, actual and perceived impacts of eagles on livestock, poultry, game and fisheries;
- Socio-economic impact, including economic appraisal of costs and benefits;
- Public perception of the project.

2. Research Objectives

2.1. White-tailed Eagle ecology – assess the habitat use, ranging behaviour, diet and survival of reintroduced eagles in the study area

1a. Monitor the ranging behaviour of juvenile White-tailed Eagles after release using a combination of field observations, radio telemetry and satellite tracking.

1b. Investigate habitat preferences of reintroduced population using a GIS-based approach to map areas favoured by White-tailed Eagles after release for both roosting and foraging.

1c. Monitor the diet of White-tailed Eagles in order to understand spatial and temporal changes within the English landscape.

1d. Monitor survival of the reintroduced population.

1e. Monitor any breeding activity.

1f. Monitor sightings of White-tailed Eagles from other populations (i.e. Ireland, Scotland, Netherlands, Isle of Wight) and their interactions with the released birds.

Contributes to:	Activity	Progress and comments
1a, 1b & 1c	Satellite-tag all juvenile WTE and manage data for ongoing analysis.	
1a and 1b	Tag all juvenile WTE with tail-mounted VHF transmitters. Use radio telemetry equipment (Yagi-antenna) to monitor movements after release.	
1a and 1b	Use a GIS-based approach to map ranging behaviour and habitat preferences of WTE after release. Produce an annual summary.	
1a	Perform GIS analysis in order to determine individual/sex-based differences in dispersal after release.	
1c	Use field observations to build up a database of WTE prey items. As a minimum database will include prey species, date and location and whether prey was seen to be taken live or scavenged dead.	
1c	Encourage members of the public to submit photographs showing WTE carrying prey in order to contribute to database of prey items.	
1c	Use camera traps to identify prey items brought to any active nests that are established.	
1a & 1d	Maintain a database on movements of individual birds and immediately investigate any sudden or unexpected changes in behaviour.	

1d	Make concerted efforts to recover the bodies of any birds suspected/known to have died in order to determine cause of death. Send for post-mortem if required/appropriate.	
1e	Closely monitor any breeding activity and ensure that key local stakeholders are aware in order to limit any accidental/avoidable disturbance.	
1f	Keep records of sightings of White-tailed Eagles from other populations (i.e. Ireland, Scotland, Netherlands) and any interactions with the released birds.	

2.2. Investigate interactions with other components of local biodiversity, protected sites and species, including features of Natura 2000 sites

2a. Monitor spatial movements of White-tailed Eagles in relation to SPA sites and important bird assemblages in the region

2b. Quantify impact of White-tailed Eagles predation on SPA birds and other local biodiversity.

Contributes to:	Activity	Progress and comments
2a	Use satellite tracking data and a GIS-based approach to map the movements of WTE in relation to SPA sites and important bird assemblages in West Norfolk and the wider region, including how this varies temporally.	
2a & 2b	Use field monitoring to assess and quantify any impacts of WTE on important bird assemblages (winter or breeding season) in West Norfolk and the wider region	
2b	Use prey database (section 1c) to analyse how WTE diet varies spatially and temporally and use these data to assess potential impacts on SPA birds and other local biodiversity, particularly any threatened species.	
2b	Use a combination of satellite tracking data and field observations to monitor the behaviour of White-tailed Eagles in relation to any breeding colonies of Spoonbills and rare egrets, and immediately investigate any reports of predation.	

2.3. Assess impact of Eagle watchers on SPA sites and develop appropriate mitigation measures

3a. Determine the most appropriate locations for establishing WTE watchpoints
3b. Determine whether the presence of White-tailed Eagles increases visitor numbers at designated sites in West Norfolk and the surrounding region.
3c. Develop mitigation measures to limit disturbance at designated sites caused by eagle watchers, including establishment of White-tailed Eagle public viewpoints.
3d. Measure effectiveness of any mitigation measures put in place to limit disturbance at designated sites caused by eagle watchers.

Contributes to:	Activity	Progress and comments
3a, 3b, 3c	Analyse satellite tracking data and field observations to identify any sensitive sites where the regular presence of WTE after release may lead to an increase in visitor numbers, and potentially lead to disturbance of SPAs/other sensitive areas.	
3b	Where appropriate work with local stakeholders to record increases in visitor numbers at SPAs/sensitive sites due to the presence of White-tailed Eagles.	
3d	Design methods to measure the success of any mitigation measures implemented to limit/reduce disturbance by eagle watchers at SPAs or other sensitive sites.	
3a.	Use a combination of field observations and satellite tracking data to determine the most appropriate locations for the establishment of WTE public viewpoints.	
3c	Provide site-specific assessment of proposed viewpoint locations in relation to potential effects and seek NE approval in relation to any conservation issues	

2.4. Socio-economic impact of White-tailed Eagle reintroduction

4a. Characterise the local eco-tourism industry in West Norfolk and surrounding area and quantify any benefits of eagle tourism for local businesses
4b. Monitor and quantify any negative impacts, specifically in relation to farming/fishing/shooting interests
4c. Evaluate the success of any mitigation measures implemented to prevent damage to farming/fishing/shooting interests

4d. Economic appraisal of the costs and benefits of the reintroduction

Contributes to:	Activity	Progress and comments
4a	Conduct online questionnaire for local businesses to quantify impacts on their activity.	
4a	Carry out follow-up, detailed interviews with smaller number of businesses.	
4b	Immediately investigate any reports of WTE predation or significant disturbance on livestock/poultry/fishing/shooting interests by visiting the site in order to consider evidence and to set-up up appropriate on-site monitoring as detailed in Risk Management Plan. Analyse satellite data to determine whether it corroborates reported problems.	
4b	Where appropriate work with poultry farmers to assess levels of disturbance caused by White-tailed Eagles to free-range flocks, using a combination of satellite data and field monitoring.	
4c	If predation or disturbance materially affecting productivity of livestock/poultry/fishing/ shooting interest is confirmed set-up appropriate mitigation measures such as visual/auditory scaring (according to recommendations from current trials in Scotland). Set-up on site monitoring to determine level of effectiveness.	
4c	Quantify the costs of any monitoring/mitigation work undertaken.	
4d	Produce cost:benefit socio-economic report to cover initial period of project.	

2.5. Public perception of the project

5a. Analyse how social attitudes towards White-tailed Eagles change over the course of the project.

Contributes to:	Activity	Progress and comments
5a	Repeat online questionnaire carried out as part of the feasibility study midway through the licence period, and again at the end, to determine how public perceptions have changed.	

2.6. Project Evaluation

6a. Evaluate the project against key objectives outlined in feasibility report.

6b. Evaluate the methodologies used for the translocation of juvenile eagles.

6c. Evaluate the success of methods used to monitor WTE after release.

6a	Evaluate annual survival of juvenile WTE compared to predicted figures outlined in feasibility report.	
6a	Evaluate dispersal and settlement of juvenile WTE compared to expected patterns as outlined in feasibility report.	
6a	Evaluate early breeding activity compared to Scottish and Irish WTE reintroductions.	
6a	Analyse sightings of WTE not released by the project in order to identify any trends in frequency of sightings, origins of birds etc.	
6b	Undertake annual evaluation of the methods for the collection, transportation and pre-release care of juvenile WTE.	
6b	Undertake annual evaluation of all aspects of the release of juvenile WTE, including post-release feeding.	
6b	Update White-tailed Eagle Reintroduction and TranslocationAdvice Note (Appendix 1 of feasibility study) according to experience gained during the project.	
6c	Undertake annual evaluation of tracking methods used to monitor the post-release behaviour of juveniles eagles, specifically the reliability and effectiveness of satellite/GSM transmitters and VHF radio transmitters.	

Appendix 4 - Visitor Management Strategy

Group of Birdwatchers from Cambridge University surveying the Ken Hill freshwater marshes in 2019

February 2021

Ken Hill White-tailed Eagle Project
Visitor Management Strategy
Version: 1

Contents

1. Background and Purpose of Visitor Management Strategy

In February 2021 the Roy Dennis Wildlife Foundation and Ken Hill Estate applied for a licence to begin a ten-year project to release up to 60 juvenile White-tailed Eagles Haliaetus albicilla in West Norfolk. The project aims to re-establish a breeding population of the species in eastern England, as set out in the project feasibility report (Dennis et al. 2021).

The White-tailed Eagle is an iconic species, and in Scotland it creates considerable interest among the general public. An RSPB commission report found that eagle watching generates up to £5 million to the economy of the Isle of Mull each year, and £2.4 million to the Isle of Skye. It is expected that the presence of White-tailed Eagles on the densely populated South Coast of England could encourage incremental tourism to the Norfolk coast and the surrounding region; however, given the high volume of existing nature-based tourism to the Norfolk coast, including many birdwatchers, the project team do not expect as great an increase to the local tourism economy as experienced in Scotland and later the Isle of Wight. Nonetheless, the presence of White-tailed Eagles could boost the overall attractiveness of the Norfolk coast, leading to incremental visitor numbers, or cause an intensification of visitors at particular sites. It is important therefore, that expectations are managed carefully from the outset of the project and that mitigation measures are implemented to ensure that eagle watchers do not disturb sensitive sites, including SPAs. As expected to be noted in the Habitat Regulations Assessment (HRA), recreation at the significant scale could result in an Adverse Effect on Site Integrity of European sites. This could occur as a result of disturbance to designated classified bird features, damage to designated plant interest features or the erosion of sensitive habitat interest features by eagle tourists. To mitigate negative effects and allow Adverse Effect on Site Integrity to be excluded, proper visitor facilities will be provided that provide managed access away from sensitive locations.

It is not possible to predict with sufficient accuracy where released eagles will settle following an initial period of dispersal post-release. Consequently, neither is it possible to identify those locations to which eagle tourists will be attracted. Therefore, it is not feasible, in advance of a release, to establish staffed watch points with the necessary infrastructure that can mitigate the effects of eagle tourism. This plan, however, sets out the type of visitor management measures that will be undertaken as part of the project, and how these measures will be delivered once eagle distribution is known.

This plan includes the following key areas:

- Interim visitor arrangements for the release area
- Visitor management during the breeding and non-breeding season
- Establishment of White-tailed Eagle watchpoints and interim arrangements
- Future monitoring plans

All of the mitigation measures developed by the project as outlined in this plan will be reviewed regularly by the project team as well as on a regular (minimum annual) basis by the project's Monitoring and Evaluation Group, as set-out in the Monitoring and Evaluation Plan.

2. Interim Arrangement for the Release Site and Surrounding Area

The likely high-profile nature of the project means that it is essential to manage expectations in the early phase before the settlement patterns of the eagles are fully understood. In this initial period it is unlikely that it will be possible to set-up designated eagle watchpoints, but it is probable that the released eagles will be seen in the proximity of the release area by birdwatchers and other members of the public.

2.1. Release Site

As noted in the project's feasibility report (Dennis et al. 2021) every effort will be made to maintain the confidentiality of the eagle release site at Ken Hill in order to limit any potential disturbance to the eagles, particularly in the sensitive period immediately after release. This approach will also ensure that neighbouring landowners/farmers are not negatively impacted. This will be achieved by:

- Clear information on the Ken Hill and Roy Dennis Wildlife Foundation websites and all other project literature stating that the release site is confidential with no public access.
- Project team will use infrastructure at the Ken Hill site to prevent/warn against unauthorised access to the release site.
- Project team will liaise closely with neighbouring landowners/farmers throughout, and respond to any local issues should they arise. Project team staff/volunteers will be on site 7 days a week whilst eagles are present in the pens and during the initial post-release phase whilst being fed. Staff/volunteers will all be trained in visitor access issues and will be available to perform access monitoring/management duties should they be required.
- Project team will liaise with bird information services to ensure that sightings of eagles at or close to the release site are not publicised.
- Project team will produce education material about access, as well as eagles, which will differ from medium/longer term material.

3. Eagle Watchpoints

As noted in the feasibility study (Dennis et al 2021) the establishment of eagle watchpoints will be the best means to mitigate any negative impacts of eagle tourists by directing visitors to areas where they will not cause disturbance to either breeding or non-breeding birds. Although the settlement patterns of the eagles cannot be reliably predicted prior to release - thus preventing the establishment of staffed watchpoints in advance - a key element of the project's Monitoring and Evaluation Plan (Section 2.3.) is to use a combination of field observations and satellite tracking and radio telemetry data to determine the most appropriate locations for the establishment of eagle watchpoints.

3.1. Interim Approach

3.1.1. Mitigation Measures

Although the establishment of formal watchpoints is the ultimate aim of the project, it is important to consider that the presence of multiple birds at a location for several weeks during the early stages of the project (i.e. years 1 and 2) has the potential to attract visitors. It might still be too early to establish a watchpoint if settlement patterns are not fully understood or the continued presence of birds not assured, but some visitor management measures may be required. This will be assessed on a case-by-case basis and will be adapted

according to local needs and the time of year given that requirement for any mitigation will differ between the breeding season and non-breeding season.
It will be particularly important to analyse satellite tracking data and field observations to identify any sensitive sites where the regular presence of White-tailed Eagles after release may lead to an increase in visitor numbers, and thereby potentially lead to disturbance of SPA birds. In such a scenario initial efforts will be made to determine whether the presence of White-tailed Eagles is leading to an increase in visitor numbers at the site. Consideration will then be given to implementing a range of mitigation measures, including:

- Directing eagle watchers to alternative viewing areas (i.e. existing birdwatching sites where eagles may be seen).
- Erecting appropriate signage according to local needs.
- Liaising with bird news services to ensure that eagle sightings at sensitive sites are not publicised.
- Production of education material about access, as well as eagles.
- Eagle staff/volunteers trained in visitor access issues and will be available to perform access monitoring/management duties should they be required.
- Work with the relevant local conservation organisations and landowners (e.g. RSPB Snettisham, NWT Holme, to educate their visitors about eagles and eagle viewing)
- Providing alternative sources of information and sightings, such as webcam footage and regular blog posts, newsletters, and social media with visual content, leveraging the established and growing Wild Ken Hill brand.

3.1.2. Mitigation Evaluation

The project team will develop monitoring methods for both SPA birds and people, including monitoring any displaced access. This will be presented to the Monitoring and Evaluation Group for sign-off and will enable the effectiveness of any mitigation measures to be evaluated. This will also be included in the annual monitoring and evaluation report. Should this work identify any residual effects, the project team will make adaptive management recommendations to the Monitoring and Evaluation Group and deliver any necessary management changes to prevent impact.

3.2. Establishing Eagle Watchpoints

3.2.1 Identification/Assessment of Watchpoints

Once the settlement patterns of the eagles are fully understood, the project will seek to establish formal eagle watchpoints in areas favoured by the eagles that afford good public access. These may be located at Ken Hill itself; the wider Wild Ken Hill project will see the development of enhanced visitor facilities to handle nature-based tourism associated with growing interest in its regenerative farming, conservation and rewilding initiatives that are currently being undertaken on site. This may allow for the use of specific platforms at designated spots that could offer views of feed sites that would be used in the initial stages of the release.
The project team is also committed to working with other local landowners and conservation organisations depending on where the eagles settle, leveraging its good relationships with the RSPB, The Norfolk Wildlife Trust, the National Trust and major coastal landowners with existing visitor facilities such as Holkham. Such a partnership-led approach will be key to the long-term success and sustainability of any watchpoint.

Watchpoints may be set-up in areas favoured by immature non-breeding birds, near eagle breeding sites or at localities where food is provided for eagles. There is potential to set-up designated eagle feeding sites (similar to those for Red Kites at e.g. Gigrin Farm in Wales), should specific landowners express an interest in doing so. This option will be explored by the project team.

Given that birds released during the course of the project are unlikely to breed until they are four-five years of age, it probable that initial watchpoints will be at sites where immature eagles can be observed regularly and easily.

Once a suitable watchpoint location has been identified, the project team, in conjunction with Monitoring and Evaluation Group, will undertake site-specific assessment of the proposed location in relation to potential effects. Consideration will be given to:

- Accessibility of the site and capacity to accommodate eagle visitors
- Whether the eagles will be fed, and if so, where and when
- Potential impact on eagles already using the site
- Potential impact on local wildlife and, in particular, SPA/RAMSAR designations. This will vary according to the time of year (i.e. potential effects on breeding/non-breeding species) and by location (as per section 3.1.1.)
- Potential impact on current land-use/local residents
- Likelihood of long-term use by White-tailed Eagles

If the watchpoint is considered viable by the Monitoring and Evaluation Group, the project team will seek approval from Natural England.

3.2.2. Day-to-day Running of Watchpoints

Watchpoints will be manned by project staff and volunteers at pre-advertised times based on periods when eagles are likely to be present. Staff/volunteers will wear branded clothing to make them easily identifiable to visitors. Suitable interpretation and signage will be developed for periods when the watchpoint is not staffed.

3.2.4. Eagle Nests

Given that White-tailed Eagles do not begin breeding until they are four-five years of age, there are unlikely to be any breeding attempts until the later part of the licence period. Nevertheless any breeding activity will be monitored closely by the project team. White-tailed Eagles can be sensitive to disturbance at key times in the breeding season and, as such, breeding activity will be kept strictly confidential where possible and the project team will work with key local stakeholders to ensure it is not disturbed at key times. Nevertheless should a nest be built in a publicly viewable location with good access then consideration will be given to establishing a formal viewpoint, based on the criteria detailed in section 3.2.1.

3.2.5. Other Viewing Opportunities

White-tailed Eagle photographic safaris are now popular with visitors and locals in Scotland and offer excellent wildlife photography as well as local business opportunities. There is a chance that boat owners on the North Norfolk coast might also try to encourage White-tailed Eagles to come close by throwing fish in the water and to start similar photographic safaris (the West Norfolk coast is too tidal for regular boat use). As a start the eagles may follow gulls that are attracted to fishing boats to scavenge dead fish. No detrimental impacts have been identified in Scotland by these activities. The project team will work

closely with local businesses to support any endeavours and to ensure that they are undertaken in a sensitive manner.

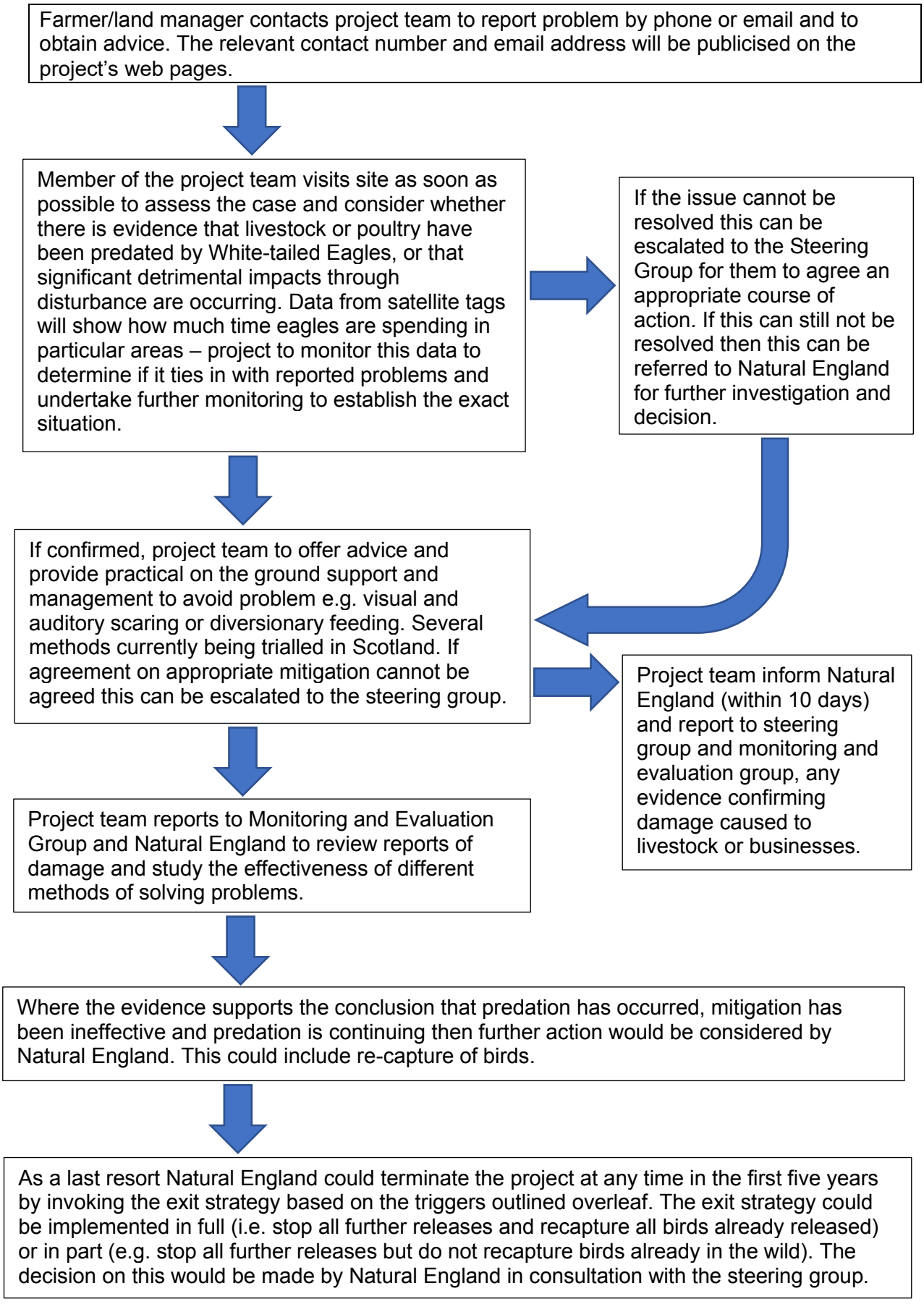
4. Dispersal of Sub-adult Eagles

Evidence from Scotland indicates that eagles are likely to settle to breed within 50-60km of the release site, and as such, this is the area expected to be covered by the HRA. However, research has shown that juvenile eagles may disperse significant distances from the release site during their first two years. During this period the project team will monitor satellite tracking data in order to identify any outlying areas where immature eagles settle. Efforts will then be made by the project team to contact key local stakeholders in order to advice on the most appropriate course of action to take. This will be particularly important if eagles to settle in areas that may be sensitive to disturbance.

5. Future Visitor Management

A strategy will be developed in consultation with the Monitoring and Evaluation Group prior to the final release phase, to embed financially viable ongoing visitor management as part of the reintroduction. This is likely to focus, in particular, on how visitor access at White-tailed Eagle breeding sites is managed as the first pairs breed and the population expands.

Appendix 5 – Conflict Management Plan – Reporting procedure for farming, fishing and shooting interests



Exit Strategy Triggers

A key role of the project Steering Group will be to objectively assess the project against the exit strategy triggers on an annual basis on receipt of the annual monitoring and evaluation report in April of each year. The exit strategy would be implemented in the event that:

- Unsustainable and detrimental effects arise as a result of the re-introduction of White-tailed Eagles;
- Any significant change occurs to the required funding or management structure of the project that threatens the project viability;
- There is unacceptable risk to human health, livestock (see notes below) or other wildlife;
- There is an unsupportable level of mortality in released animals as a result of persecution, human intervention, or natural mortality attributable to the project;

The project Steering Group may also be required to meet on an extraordinary basis if exit is triggered by a significant event, or combination of events, outside of the planned meeting schedule.

The final decision on whether the Exit Strategy will be implemented, or any white-tailed eagle recaptured, will rest with Natural England.

<u>Notes</u>

1. A separate Natural England licence is required to trap white-tailed eagles to prevent serious damage to livestock.
2. For a licence to be issued the damage must be, or must be likely to become, serious. Serious damage is damage to an economic or financial interest that exceeds mere nuisance, minor damage or normal business risk.
3. It is not possible to set fixed criteria for determining what is serious damage and it will be assessed on a case by case basis.
4. In determining the seriousness of damage the frequency with which it occurs and the number of eagles involved must be considered. Eagles that have become habituated to predating livestock are more likely to cause serious damage than eagles that predate livestock occasionally or opportunistically.
5. Scavenging carcasses or predation of moribund animals would not be considered serious damage.
6. Licensed action is not an alternative to good practice and management. We therefore expect adaptation to changes in risk of damage, and expect reasonable, non-lethal measures to be put into place to prevent damage where evidence suggests damage is starting to occur or is becoming likely.

Appendix 6 – Project Governance

Project Steering Group structure

The Project Steering Group would include a representative from each of the following groups:

- Roy Dennis Wildlife Foundation
- Ken Hill Estate
- Norfolk Wildlife Trust
- Lincolnshire Wildlife Trust
- Royal Society for the Protection of Birds
- The National Trust
- The Norfolk Coast Partnership
- The Wash and North Norfolk Marine Partnership
- Natural England regional advisory team
- Visit West Norfolk
- CLA
- GWCT
- Norfolk FWAG
- NFU
- NPA
- BFREPA
- NSA
- Holkham NNR
- Broads Authority

Project Steering Group Terms of Reference

Purpose/role of this group

This group will principally assume the following roles:

- To assist the Roy Dennis Wildlife Foundation and Ken Hill with undertaking the White-tailed Eagle Reintroduction project, by sharing information, experience and advice.
- The Steering Group will meet to monitor and evaluate the progress of the project, to address any issues and identify any conflicts. Ensure the projects on going compliance with all licences, regulations and agreements.

- The Steering Group will establish and receive reports from the Monitoring and Evaluation group.
- The Steering Group will receive reports from the Project Team prior to each meeting to report on project progress.
- To help facilitate better communication, participation and liaison, following the Communications plan

Members, Chair, Attendees, Secretary, Terms of Office

- The Steering Group will normally consist of no more than 18 as listed above.
- New organisations may be added by agreement of the Steering Group and on review.
- An independent Chair will be appointed to the Steering Group (by the RDWF and Ken Hill) and will serve for five years. Natural England will be consulted on the individual appointed to Chair.
- Natural England will be the deputy chair.
- This is a voluntary group.
- Members of organisations should be accountable for reporting back to their wider organisations or groups.
- Members will be nominated by the organisations and representation at meetings may be replaced by other members of that organisation, but continuity of participation is preferred.
- The Steering Group may agree additional attendance at meetings (such as expert specialists and any members of the ancillary groups) in consultation with the Chair.
- The Steering Group will meet twice per year. Any additional meetings will be called at the discretion of the Chair or Natural England.
- The Secretariat for the Forum will be arranged by Ken Hill.
- The membership of the Steering Group will be reviewed after five years of a license being issued.

Other terms of Reference

- To provide a forum to update stakeholders on progress of project, review issues, discuss options for resolving any issues and hold accountable against Principles set out in the Natural England licence.
- Provide the opportunity for members to hear evidence and be updated on emerging issues in the project locally and nationally.

- To hear evidence from the Monitoring and evaluation Group and request the Monitoring and evaluation Group to undertake other areas of research and/or evidence as required.
- To receive, comment and make recommendations from the outputs of the ancillary groups.
- To receive and comment on the annual review of the project.
- Foster better interaction between the different groups and stakeholders and support transparency and knowledge exchange on restoration activity.
- To identify opportunities to promote the projects outcomes.
- The steering group has the opportunity to continue to meet after the completion of the initial release phase of the project as needed. The project team can continue to host this group.

Minutes and Reporting

- Transparency: the Steering Group's constitution and working arrangements are subject to a review at the end of the first year, then every second year.
- Meetings of the Steering Group will be quorate if at least the following are present: Ten members of the Steering Group, including the Chair or Deputy Chair and Natural England representative.
- All proceedings and resolutions of this Steering Group will be minuted; such minutes being circulated, and agreed as accurate and then formally approved and signed at their subsequent meeting. Minutes will be circulated to group members and to those in attendance.
- These Terms of Reference and protocols will be reviewed / approved at the first meeting of the Forum.

Confidentiality

Items discussed at the group may be identified as being of a confidential nature, in order to protect the birds or sensitive sites. Information discussed at any meetings that should remain confidential will be identified as such.

Project Monitoring & Evaluation Group structure

The Project Monitoring and Evaluation Group would include a representative from each of the following groups:

- Ken Hill Estate
- Roy Dennis Wildlife Foundation
- Royal Society for the Protection of Birds
- Norfolk Wildlife Trust
- Lincolnshire Wildlife Trust
- Wash Wader Ringing Group
- University of East Anglia
- The National Trust
- Natural England regional advisory team

Monitoring and Evaluation Group Terms of Reference

Purpose/role of this group

This group will principally assume the following roles:

- to assist the Roy Dennis Wildlife Foundation and Ken Hill with undertaking the White-tailed Eagle Reintroduction project, by sharing information, experience and advice.
- to help set up a monitoring and evaluation programme for the project and make sure it is fit for purpose.
- to receive and comment on the annual research carried out by the project team.
- to identify areas needing further evidence and research, and to structure how to conduct that research and report results back to the Steering Group.
- to enable suitable evidence and data collection to support review and evaluation of the project's progress against key milestones and any potential need for management, alongside supporting evidence collection for wider understanding and academic research.
- to respond to requests from the Steering Group on areas identified as needing further investigation and to enable evaluation against project objectives or licence conditions.
- to liaise with other reintroduction projects across the UK and abroad and draw in any research from them.
- to help facilitate better communication, participation and liaison.

Members, Chair, Attendees, Secretary, Terms of Office

- The Monitoring and Evaluation Group will normally consist of no more than 9 members as listed above. This is a lower number than on the Isle of Wight project. The project team for the Ken Hill project believe tat the Monitoring and Evaluation group should be agile, and able to respond to requests from the Steering Group – where all key interests are represented – in a timely and high quality manner. Increasing the number of members of the Monitoring & Evaluation Group would restrict its ability to do so.
- New organisations or individuals may be added by agreement of the Steering Group and on review.
- An independent Chair will be appointed to the Monitoring and Evaluation Group (by the Roy Dennis Wildlife Foundation and Ken Hill) and will serve for five years.
- Natural England will act as the deputy chair when needed.
- This is a voluntary group.
- Members of organisations should be accountable for reporting back to their wider organisations or groups.
- Members will be nominated by the organisations and representation at meetings may be replaced by other members of that organisation, but continuity of participation is preferred.
- The Monitoring and Evaluation Group may agree additional attendance at meetings (such as expert specialists and any members of the ancillary groups) in consultation with the Chair.
- The Monitoring and Evaluation Group will meet twice per year. Any additional meetings will be called at the discretion of the Chair or Natural England.
- The Secretariat for the Forum will be arranged by Ken Hill

Minutes and Reporting

- Transparency: the Monitoring and Evaluation Group's constitution and working arrangements are subject to a review at the end of the first year and then every second year.
- Meetings of the Monitoring and Evaluation Group will be quorate if at least the following are present: four members of the Group including the Chair or Deputy Chair and Natural England representative.
- All proceedings and resolutions of this Group will be minuted; such minutes being circulated, and agreed as accurate and then formally approved and signed at their

subsequent meeting. Minutes will be circulated to group members and to those in attendance.

- These Terms of Reference and protocols will be reviewed / approved at the first meeting of the Forum.

Confidentiality

Items discussed at the group may be identified as being of a confidential nature, in order to protect the birds or sensitive sites. Information discussed at any meetings that should remain confidential will be identified as such.

Appendix 7 – Communications Plan

Title	White-tailed eagle reintroduction programme
Owner/Version/Date	Dominic Buscall/v1/16 Jan 2021

1	Background
	Natural England is assessing a licence application made by the Roy Dennis Wildlife Foundation and the Ken Hill Estate to reintroduce white-tailed eagles to West Norfolk and the surrounding region. The ten year reintroduction proposals would see up to 60 birds released at the Ken Hill Estate in West Norfolk between 2021 and 2025. It will take several years for the birds to become established and breeding is not expected until at least 2025. A population established in this location will link and support existing communities of these birds in France, The Netherlands, Ireland, Scotland, and the Isle of Wight helping to secure a future of the White-tailed Eagle in the UK and Western Europe. The birds would be closely monitored using satellite tracking.
2	**Aim**
	To ensure key audiences and stakeholders know about, understand and if possible support the reintroduction programme.
3	**Objectives**
	• Inform the understanding of the value of this and similar reintroduction programmes by sharing evidence, learnings and insights • Engage the wider general public and media in the importance of this conservation work through positive messaging and public engagement opportunities • Promote the benefits of partnership working between the Ken Hill Estate and RDWF, demonstrating how a carefully-considered and evidence-based wildlife project will have positive outcomes for biodiversity, people and the economy. • To manage risk and public concern through open, evidence-based communication.
4	**Resources & Responsibilities**
	The communications plan and its delivery will be led by the project team, which comprises two members of RDWF, and six members of the Ken Hill Estate and the marketing firm used by its business. Media issues/enquiries will be managed by the project team who will also liaise with the DEFRA/NE communications teams. Stakeholder and public engagement communications will be managed by the Ken Hill Estate.

	[redacted]
5	**Strategy**
	To tell the story of the reintroduction and its positive impacts by… • Proactively managing communication and engagement activities using carefully planned activities at key stages and milestones within the project. • Regularly reviewing messaging to ensure a consistent story about the aims and benefits of the project, our methods and the collaborative way we are working. • Establishing clear communication channels and information flow across the project and its groups to ensure proactive management of emerging issues or concerns. • Maintaining high levels of support for the programme through positive communications • Creating a robust incident reporting and escalating procedure, and supporting communications processes.
6	**Target Audience(s)**
	Media – national, regional, specialist, local (Norfolk/N. Cambs/E. Lincs) and hyper local (west Norfolk) Stakeholders • Natural England • DEFRA • Farming community • Fishing community • Shooting community • Landowner and land manager organisations • Ornithologist/wildlife experts • Conservation bodies/NGOs • Local: residents, councillors & officers, farmers, local landowners, tourism sector and local bird and nature reserves • Regional – residents, councillors & officers, farmers, local landowners, tourism sector • National – special interest groups, general public Internal – Wild Ken Hill, RDWF staff and organisation
7	**Messages**
	Messaging for the first phase of the project…. **CONSERVATION –LED & LONG TERM -** This long term project aims to reintroduce white tailed eagles across the East of England, returning a lost species that can offer wide ranging benefits to nature, landscapes and people. A population established in this location will link and support existing communities of these birds in the Isle of Wight, France, The Netherlands, Ireland and Scotland, helping to secure a

future of the White-tailed Eagle.

EVIDENCE BASED - The project is being run by Wild Ken Hill in partnership with the Roy Dennis Wildlife Foundation, both of whom are experts in wildlife conservation and research, specialists in managing woodland habitats, and experienced ecologists. The team have conducted extensive research and visited similar programmes successfully run in
Ireland and the Netherlands as well as the RDWF reintroduction they have undertaken themselves on the Isle of Wight.

COLLABORATIVE - The team are working closely with local groups and a range of organisations representing farmers, councillors, fishermen, the tourism sector and the local community. These groups are all directly involved in the project steering group and the monitoring and management group. Following a consultation period, public support for the project was shown to be very high, with 91% of people surveyed supporting the reintroduction of the birds to the area.

8 Risk/Line to Take

Risk	Line to Take
Farming community criticism and resistance to the project	Understand concerns. Highlight the collaborative nature of the project and the involvement of farming representatives – including any positive examples of shared working on this. Reflect concerns and emotions, focus on the factual evidence and experience of similar projects
Concerns re the security of the release site	Explain why it is important that the birds have an opportunity to settle and become established and how people can best support this.
Damage to farming stock	Transparency and clarity in the governance and procedures for complaint. Fast, proactive and clear messaging about the facts of any actual or alleged incident. Focus on actions to be taken and planned processes activated (including use of tagging and monitoring data and equipment).
Damage to other wildlife	Fast, proactive and clear messaging about the facts of any actual or alleged incident. Focus on actions to be taken.
Failure of the first batch of the eagles to settle and survive	Explain the complexities of the project and its long term nature. Be open and

		honest about the difficulty of predicting success rate and manage expectations accordingly. Specific messaging to be determined based on the reasons for the lack of survival. Look at opportunities to use tracking data where appropriate.
	Public demands to view the birds before the they are firmly established	Explain the needs of the birds and how people can best support the project Identify ways people can get involved (technology/social media focus) Share stories and updates from the team
	Negative impacts on wider wildlife caused by tourism/ public interest in viewing the eagles	Review as part of the overall visitor management plan
	An incident or set back in a similar reintroduction scheme – e.g. Ireland, – raising wider concerns and our response to it.	Proactive and clear messaging about the facts of the incident commonality and differences, and where necessary how we can address any issues it raises.
	Concerns that the birds will be persecuted	Highlight monitoring and tracking systems in place including VHF radio transmitters and satellite tags. These will be used to closely monitor the activity and behaviour of the birds.
	Claims that the reintroduction will fail	The release is based on proven methodology used successfully for white tailed eagle release in Scotland and Ireland. There is a detailed and fully costed exit strategy that would allow the birds to be recaptured if there were major unforeseen problems.
	Concerns that the birds will introduce disease	A comprehensive disease risk analysis was undertaken as part of the feasibility study. Disease risk is low.

9	**Tactics & Action**
	<u>Ensure all key audiences receive accurate, timely and regular communication relating to the programme and its development</u>. • Identify and map key milestones and communication points in the project plan. • Produce high quality media materials around these key milestones in the projects development – i.e. news releases, photo based stories and images, media factsheet.

- Social media
    - Create a hashtag to identify and link social media content
    - Timely updates and commentary on the project drawing on high impact photography using Wild Ken Hill, Forestry England and RDWF channels.

- In the first year, target two or three top tier media outlets for feature based coverage of the project and its benefits

- Develop regular use of local media outlets to share information/project updates and create a sense of ownership.

- Include as part of Ken Hill Estate's monthly newsletter that is shared with over 1,000 core stakeholders including local politicians, nature/conservations NGOs.

- Identify key stakeholder external meetings – i.e. the RSPB, Norfolk Wildlife Trust, etc., – and offer content and speakers where relevant.

- Provide regular updates on the Wild Ken Hill and Roy Dennis Wildlife Foundation websites.

- Timely communication of milestone success or issues management to all major stakeholders, including Government.

Ensure clear processes are in place to support the involvement and engagement of all key stakeholders

- Create a balanced membership on the steering and monitoring groups ensuring a wide range of interests are represented.
- Identify an agreed list of all key stakeholders, their contacts, and how they will be communicated with.
- Identify key local stakeholders for the project officer to establish and maintain one to one relationships with. Activities on this will include regular meetings and visits, updates on the project, and where appropriate dedicated events.

Maintain high levels of public support for the programme

- Deliver a program of public education events providing updates about the project

    - Engage with the general public and local interests via the Wild Ken Hill social media and website as well as regular newsletter.

    - Identify key local groups to deliver talks or online webinars to including local conservations groups, schools, and other relevant community groups as well as the Snettisham RSPB which adjoins Wild Ken Hill.

    - Include the programme as part of the nature based tourism offering which Wild Ken Hill will introduce in 2021. Giving opportunities for learning and education on all aspects of nature, wildlife, ecosystems and how those components weave together.

- Working with Wildings on education – a local organisation who host weekly forest learning sessions for schools, families and groups; based at Wild Ken Hill.

- Identify opportunities to participate in external events offering a good opportunity to reach core audiences – i.e. conferences, community events, stakeholder forums including events and shows in East Anglia.

- Create supporting material for these events, including;
  - Presentations and Q&As
  - Presenter profiles
  - Schools materials – factsheets, themed colouring or activity sheets, competitions or tasks/challenges

- Create a series of opportunities for public engagement and promotion of the project to this wider audience

  - Explore the options for naming the birds and to involve different members of the local community in this – i.e. local schools naming and 'adopting' the birds, or a competition to name the birds.

  - Encourage members of the public to share any sightings of the birds on social media.

  - Create ways for the public to engage with the monitoring/tracking data – using web/online as the main channel for this. Use these to provide regular website updates (approximately one a month).

  - Promote appropriate (good public access, existing facilities, landowner agreement) viewing spots (initially at Wild Ken Hill, but moving forward engaging with local interests and reserves) once these are well established. Agree how these are set up, promoted, hosted, and the communications collateral needed onsite to support these.

  - Consider the opportunities for web cams/ live feeds that can be shared online.

Proactively and effectively manage and respond to any issues or concerns

- Establish clear governance and a recognised procedure for complaints to clarify the route to take for communication and actions to be taken.
- Create a dedicated point of contact for the project team – using a dedicated email address managed directly by the Project Officer – and publicise this amongst all key groups and on key channels.
- Share the incident reporting process with the steering group and all other relevant stakeholders
- Review the effectiveness of this process after each incident to refine and amend it.
- Create a mechanism/forum to share information between this and similar introduction projects (Isle of Wight, Ireland, Netherlands, and Scotland) in order to

	proactively identify and manage emerging issues and concerns.
10	**Timetable**
	This is a ten year programme and as such the Communications plan will take a phased approach. The initial phase will include the establishment of the communications processes and messaging, communication around the collection of the birds, bringing of the birds to the site, the settling process, and their initial release. This will run through until late summer. The next phase will run from late summer through to the following spring (2022). It will focus on sharing some insights and information from the monitoring of the birds once they are released, and appropriate activities around viewing opportunities. The communications plan will be reviewed on an ongoing basis and refreshed for each new stage of the project. This will include specific communications activities as monitoring data and trends become available, as progress is made on public viewing spots and when a greater level of public observance/access can be established.
11	**Measuring success**
	Media coverage • Monitor & review media coverage (inc. social media comments and engagement levels) looking at tone and frequency of coverage, and the penetration of our key messages. • Review sentiment expressed in the coverage towards the project by key audiences Public Support • Measure support for the project and its roll out amongst local and regional residents, using the survey conducted during the consultation period (prior to the licence being granted) as a benchmark. Timescales/frequency TBC. • Incorporate a feedback mechanism into public events and talks and track sentiment at these on repeat sessions and visits. • Use social media tools and analysis to track public sentiment towards the project as well as regular polls and an open an honest policy of giving everyone a chance to ask questions and give feedback Key stakeholders • Measure and assess feedback from the steering and monitoring groups Benefits to the local area/socio-economic impact • This will be assessed as part of the overall monitoring programme

Appendix 8 – Organisational statements

Forestry England

Dominic Buscall
Ken Hill estate

6 Nov 2020

National Office
620 Bristol Business Park
Coldharbour lane
Bristol
BS16 1EJ
Andrew.Stringer@forestryengland.uk
forestryengland.uk

Head of Environment & Forest Planning
Andrew Stringer

Dear Dominic Buscall,

We are writing in support of your proposal for a sea eagle (*Haliaeetus albicilla*) re-introduction to the North Sea coast.

Forestry England support reintroduction projects that fully conform to the IUCN reintroduction guidelines, and the upcoming Natural England Code for Conservation Translocations. These help to ensure that habitat requirements are met, that local communities have been engaged, consulted, and are supportive, and help maximise the overall likelihood of success.

Alongside the Roy Dennis Wildlife Foundation, Forestry England are currently reintroducing sea eagles to the Isle of Wight. A second reintroduction to England would be highly beneficial, as mutual reinforcement between the two populations would increase population stability and the likelihood of success.

The UK is currently sorely lacking in top predators. These essential components of an ecosystem are vital to help balance and stabilise common prey populations, helping rarer species thrive.

We look forward to seeing the development of the project and wish you the very best of luck.

Yours Sincerely

Andrew Stringer
Head of Environment and Forest Planning

Victoria.egan@nationaltrust.org.uk
Direct line: +44 (0) 1263 740241
Friday, 11 December 2020

National Trust

Dominic Buscall
Wild Ken Hill
Heacham Bottom Farm
Heacham Bottom
Lynn Rd, King's Lynn
PE31 7PQ

Dear Dominic

Letter of Support – Wild Ken Hill White Tailed Eagle Reintroduction Project

Thank you for meeting with National Trust, via Zoom, on 30 November 2020 to explain the Wild Ken Hill White Tailed Eagle reintroduction project being developed in partnership with the Roy Dennis Foundation and allowing us to ask questions. We are grateful to have been engaged in the proposal at an early stage and understand that the project will be informed by a feasibility study, public consultation and subject to a Natural England licence application. Subject to the findings of that work and assessment we are happy to support the project in principle.

Please contact us with anything you consider would be helpful for us to be kept abreast of and when you are at the point of establishing the Steering group?

Good luck in taking this project forward.

Yours sincerely

Victoria Egan - General Manager - Norfolk Coast and Broads

National Trust
Norfolk Coast and Broads Office,
Friary Farm, Cley Road,
Blakeney,
Norfolk. NR25 7NW
Tel: +44 (0)1263 740241
www.nationaltrust.org.uk

giving nature a home
England

RSPB Norfolk & Lincolnshire Area Team
Steve.rowland@rspb.org.uk

Dominic Buscall
Ken Hill Estate
Snettisham
Norfolk

12/11/20

Dear Dominic

Ken Hill Estate, Norfolk, proposed White Tailed Eagle reintroduction.

It was good to meet up online with you and Rod the other day, like the rest of the RSPB team present I found it a really useful conversation.

You asked for a letter of support from the local RSPB team and I am happy to be able to write this letter to provide that. As you know our national policy position is that we strongly support the principle of restoring White Tailed Eagles to their former range and so we welcome this proposal by the Ken Hill Estate and the Roy Dennis Wildlife Foundation.

As you know at our RSPB Snettisham reserve which neighbours your estate, we have recently hosted a White Tailed Eagle from the Isle of Wight reintroduction, a spectacular sight enjoyed by staff and visitors. We look forward too many more such experiences at Snettisham and also at our nearby RSPB Titchwell Marsh reserve as this species regains its place in the landscape.

Please let me know if I can be of further assistance either locally or acting as a link to our national teams.

Good luck as you develop this exciting project.

I am currently working from home, please address any correspondence to my email address.

Best wishes,

Steve

Steve Rowland
RSPB Area Manager, Norfolk and Lincolnshire

23rd Sept 2020

To whom it may concern,

We at Rewilding Britain have been consulted by the Ken Hill Estate regarding their plans to re-introduce the White-tailed Eagle at the Estate in West Norfolk as part of the Wild Ken Hill project.

We strongly support this reintroduction. Ken Hill and the nearby areas of The Wash and the North Norfolk coast, offer the ideal habitat for this bird, and will play a key role in reinstating this iconic species to its former range, as well as helping to connect up the existing populations in Ireland, Scotland, and the Isle of Wight with those on the continent. In addition, this charismatic species has the ability to inspire and engage people with nature, and will undoubtedly provide a boost to the local economy at a time when a green recovery is critical.

We also understand that evidence to date, from the continent and from the Isle of Wight project, strongly supports the idea that White-tailed Eagles can co-exist comfortably with people, farming systems, and existing wildlife in today's modern English landscape.

Overall, we are therefore strongly supportive of this reintroduction proposal, and we hope that Natural England will be similarly supportive.

Yours sincerely,

Alastair Driver

Prof Alastair Driver

Director, Rewilding Britain

WASH WADER RINGING GROUP

19 December 2020

RE: Norfolk White-tailed Sea-eagle re-introduction

The Wash Wader Ringing Group has been engaged in the scientific study of the birds of The Wash since 1959. As part of the British & Irish Ringing Scheme (operated by the British Trust for Ornithology), we capture and mark birds on the Wash to monitor their survival and movements to better understand both their biology and their role as indicators of the health of The Wash ecosystem. We focus on 11 priority species of wader, many of which occur on The Wash in internationally important numbers.

We wholeheartedly support plans by Wild Ken Hill to re-introduce White-tailed Sea-eagles to West Norfolk. Historically, they would have been an integral part of the Wash ecosystem and there is no reason to suppose they could not thrive in the current circumstances. We judge it likely that they will have a minimal impact on the waders of the Wash, since they are unlikely to prey on them directly. The data we collect will, of course, be available to help monitor and understand any changes that occur post-release. Furthermore, returning such an iconic species to The Wash should help to positively engage a wider range of people with the Wash, its wildlife and its landscapes, leading to greater support for the care and management of this unique and valuable ecosystem.

If further information is required, please do not hesitate to contact me.

Dr Rob Robinson

Chair,
WWRG Scientific Committee

Email: rob.robinson@bto.org
Website: wwrg.org.uk

NFU Position on proposed White Tailed Eagle release programme at the Ken Hill Estate, Norfolk.

The NFU is generally opposed to species re-introductions as they can present risks to farm businesses and we feel that effort and funding would be better directed elsewhere supporting the resilience of our existing native wildlife, rather than focusing on reintroducing species which may no longer be compatible with modern day circumstances.

The NFU and its membership in the surrounding areas of Norfolk, Cambridgeshire, Suffolk and Lincolnshire have reviewed the proposals to release White Tailed Eagles (WTE) on the Ken Hill estate to examine the potential benefits and risks of the project. Over 600 members within 50km of the release site were sent details on the project and invited to a member webinar where the Ken Hill estate kindly spoke to outline the project proposal and take member questions. There were around 40 farmers in attendance at the webinar. Many members – both webinar attendees and others who have reviewed the project website - have subsequently submitted their views to the NFU.

We have also had extensive conversations with both colleagues and farming members on the Isle of Wight (IoW), who have first-hand experience of WTE introductions in the very similar project to this proposal which began in 2019. There remain many concerns amongst farmers on the island, which remain unaddressed despite the project being in its third year.

There is a general feeling amongst our farming membership that high profile species reintroduction projects such as this would benefit from an extended project life rather than the 5 years of the IoW project and proposed for this Norfolk project. A more sensible approach would be to use the monies associated with this proposal to extend the life of the IoW project to properly and transparently assess the longer term impacts of WTE before extending releases to other regions.

Following on from the webinar and review of the project materials available on the website, our members have a number of concerns about the reintroduction.

<u>Impact on livestock, especially sheep & lambs, piglets, deer calves and free-range poultry</u>

We are aware of the problems caused by WTE to livestock in Scotland, and have had discussions with our Scottish counterpart the NFUS. We are not convinced that the evidence to suggest predation would not pose an issue in lowland England is strong enough. It is too early to use the Isle of Wight as an example or comparison, given the birds remain juvenile and at low numbers.

We received concerns from pig, poultry (both layers and broilers), sheep and deer members dismayed that the project proposers refused point blank to consider establishing a compensation scheme. Members feel that if predation or worrying is believed to be trivial then there is nothing to lose by committing to a compensation scheme as has been done elsewhere.

Concerns over these birds being vectors of Avian Influenza were also raised. Other members also feel the project is incompatible with the seaside tourism on both the Lincolnshire and Norfolk sides of the Wash with potential fears over the taking or worrying of pets, particularly cats. One non-farming concern was raised regarding the damage that might be done if WTE hit an offshore wind turbine.

Impact on general wildlife, including rare and game birds

Many members were also concerned about the impact WTE would have on their conservation efforts and those of the many landowning environmental NGOs in the area. They feel that introducing a new top apex predator would be likely, on balance, to adversely effect the gains that have been made in bolstering the populations of red list species of birds, including other raptors such as marsh harriers and pink footed geese. WTE are also a threat to recovering populations of brown hares and other small mammals.

As the birds are already coming into the area from the Isle of Wight there is no need to release them here just increasing the negative impacts on farmland and garden birds as well as small mammals.

Accountability for the project in both the short and long term, including responsibility for the birds beyond the five year project lifetime

Many members expressed concerns during the webinar and subsequently around the financial effect on their farm business should predation occur, or should the eagles cause distress within their livestock. The Ken Hill estate were unable to address these concerns during the webinar stating that they would not commit to offering a compensation scheme during the project should any farmers be affected. We do however appreciate the offer to work with our members, should a licence be granted, to study the impacts on productivity from worrying.

The lack of any commitments of any kind beyond the five year project period is also of concern. It is felt that Natural England, where minded to issue licences, should make the license conditional on the project taking responsibility for the released birds during their first five years of breeding activity. So in the case of WTE project responsibility should be for ten years.

In summary our members do not feel like they have any support should the WTE cause damage – either through predation or worrying – to farm livestock or species in the wild and therefore they feel that they have no option but to object to the proposals.

The NFU remains committed to continuing to work with the Ken Hill estate to see if a more common ground of accommodation could be found. Should the proposal gain the appropriate licence form Natural England in spite of our concerns, we would continue to work with the project to see that there are adequate measures in place to guarantee the impacts on livestock businesses and conservation efforts are managed and dealt with appropriately.

A number of members have tried to access the survey to submit a response over the weekend of 13-14 February to find that the website is unavailable. I can also confirm that the survey was already closed by 9:30am on Monday 15 February, which was given as the last day for submitting responses. Thus a number of interested parties that wished to respond will not have been able to.

Giles Wagstaff
Natural England
County Hall
Spetchley Road
Worcester
WR5 2NP

National Pig Association
Agriculture House
Stoneleigh Park
Warwickshire
CV8 2TZ

Email: charlie.dewhirst@npanet.org.uk

16 February 2021

Dear Mr Wagstaff,

Consultation on the proposed White-tailed Eagle (WTE) release programme at the Ken Hill Estate, Norfolk

The National Pig Association (NPA) is the representative trade association for British commercial pig producers, is affiliated to the National Farmers Union (NFU) and represents the interests of NFU members that produce pigs and the pig industry interests of its Allied Industry members.

Defra statistics show the Eastern region of England accounts for around 25% of all pig production in the country, with more than a million animals across Norfolk, Suffolk, Cambridgeshire and Lincolnshire. 40% of the UK's sows are permanently housed outdoors, the majority of which are sited within this target location and therefore likely to be impacted directly by the proposed release.

We do not support the reintroduction of White-tailed Eagles (WTE) in such a pig dense area whilst the Isle of Wight project is yet to demonstrate impact and potential risk.

Impact on sows and piglets

The NPA has significant concerns over the introduction of an apex predator into an area with a high concentration of outdoor sows and piglets. The public meeting held by the NFU in January revealed that the introduction of WTEs in Scotland had resulted in the predation of lambs. Whilst assurances that this would not occur to similar-sized livestock, such as piglets, in Norfolk were given because of the abundance of natural prey, we have concerns about the evidence behind this claim. The Isle of Wight scheme is still in its infancy and therefore we are yet to see the full impact. More detailed analysis of the data from the existing schemes in neighbouring European countries, particularly those with significant pig production such as Denmark and the Netherlands would be welcome, but again are not comparable because of the lack of outdoor pig production in these countries.

There is also the issue of impact on sow productivity. It is well documented that if sows are disturbed during or soon after giving birth, they are likely to crush, trample or predate their own piglets. We have seen evidence from the Ken Hill Estate where one of the Isle of Wight eagles had spent a significant amount of time loafing around an outdoor pig unit. The fact that the eagle spent so much time around a pig unit is concerning in itself, and whilst there was no observed evidence of piglet predation in this instance, the sudden appearance of large birds could well impact on sow behaviour. We are also concerned that once breeding pairs are established, if one happened to be near to an outdoor pig unit, piglets straying from their arks would be easy prey and there would be no way of moving the nest.

The Ken Hill Estate has intimated that no compensation scheme for lost livestock would be necessary because no livestock will be lost to WTEs. We find this assumption incredibly naïve and nigh on impossible to predict. If those behind the scheme are so confident of this outcome, it would seem logical to put a compensation scheme in place to reassure neighbouring farmers. Any such compensation scheme would be cost free if no livestock were lost.

Impact on day-to-day farming

There is no way to prevent a breeding pair of WTEs from nesting on land outside the boundaries of the Ken Hill Estate and indeed, the owners have said it is their intention that the birds do disperse. There appears to have been no consideration at all given to the impact of having a nest on private land, which could prevent our members from undertaking normal farming operations, building work or receiving planning permissions. This would be an unacceptable disruption to business for our members and must be more clearly addressed by those behind the scheme.

Long term accountability

The Roy Dennis Wildlife Foundation state that they will only take responsibility for the first five years of the project, which is shorter than the length of time it will take for breeding pairs to establish. Most of the problems that our members are likely to experience will potentially begin beyond that timescale, at which point there will be no accountability. The NPA does not agree that any new licences should be granted until the risks and implications of breeding pairs generated by the Isle of Wight project settling over the UK are properly understood.

In addition we feel that the Foundation should have a burden of responsibility placed upon it for at least 10 years within the existing project so that problems arising once breeding pairs are established can be addressed.

Summary

The NPA has some very significant concerns about this project which we would like to be addressed in the meantime. We specifically would like the following to be undertaken:

- The development of a compensation scheme for livestock predation;
- Full analysis of the indirect impact on farms where breeding pairs nest (such as impact on planning and building regulations);
- Further detailed analysis of established schemes in neighbouring European countries, specifically on predation and nesting habits;
- A delay to the Ken Hill Estate project so that the impact of the Isle of Wight scheme is better understood;
- A commitment by the Roy Dennis Foundation to oversee the scheme for at least 10 years;
- Outline how the Roy Dennis Foundation plans to engage with and communicate various updates with neighbouring pig producers throughout the lifetime of the project.

Other comments

We had significant issues accessing the consultation online. It was not available when we tried to access it during the week commencing 8th February and others have reported that it was closed on the morning of 15th February, which was the last day for submissions. We are aware of members who wished to provide feedback that have been unable to do so.

We are also concerned by the very limited scope of this consultation which we believe should have been UK wide, considering the natural behaviour of the eagles and their propensity to disperse from their release area – which has already been proven to be far greater than 50km.

We would welcome further discussion on the issues raised within this response.

Yours sincerely,

Charlie Dewhirst
NPA Senior Policy Adviser

17th February 2021

National Sheep Association
The Sheep Centre, Malvern
Worcestershire, WR13 6PH
Tel: 01684 892661
Fax: 01684 892663
enquiries@nationalsheep.org.uk
www.nationalsheep.org.uk

Dominic Buscall
Project Manager
Wild Ken Hill

Via email: dominic@wildkenhill.co.uk

Dear Dominic,

Many thanks for taking the time on 2 occasions to discuss your plans with us for the release of White Tailed Sea Eagles as part of the Wild Ken Hill rewilding project.

We have encouraged our members to respond to your on-line consultation and to give their own independent views and I hope that a number have taken time to do this.

The NSA is a membership organisation for sheep farmers, and as such we have sheep farming interests at our core. However, our organisational interests, and that of most of our members, extend to the relationship between sheep farming, our grazed environments, and biological life, and we believe these elements are closely connected and to an extent symbiotic in nature. In addition, the image of our industry is dependent on a good environmental reputation. We are an industry that is involved in 'land sharing' more-so than 'land sparing', and the value of soil life, insects and bugs, birds, and mammals, within and around the grazed environment is of key interest to us.

Species reintroductions are something that we consider very seriously regarding the impact they can have on our industry, the potential impact on traditional farmland ecology, and the sustainability of the species release in question. We play an active and supportive role in the steering arrangements for the Isle of Wight WTSE release and we do this in a spirit of positivity even though we have many members in Scotland who report serious problems being caused by a large population of these birds.

With regard to your plans to undertake a further release at Wild Ken Hill our considered position is that a further release is unnecessary and not desirable at this stage. Our concerns can be summarised as follows:

- We strongly believe that with the release of a very mobile species such as the WTSE any consultation process should be fully national and be carried out independently. The long term intention is for this species to spread across the UK and it is only right that any consultation is done on a UK wide basis, otherwise this will be seen by many as rewilding by stealth.

Continued / ...

- We are concerned that releases like this are done with short (5 year) 'projects', where serious care and ownership of the released birds is undertaken but with no consideration or assurances beyond the end of the project. We believe that Natural England should consider this fact within any licence application with assurances given on compensation and mitigation approaches where problems are encountered.

- We believe that with a resident population of WTSE's in Scotland, and a release in mid flow on the Isle of Wight, there are enough birds to monitor and learn about their positive and negative impacts. The oldest Isle of Wight birds are just two years old and we are informed that behavioural patterns and breeding will not settle until the birds are 5 years old. We strongly recommend that a bigger commitment is made to longer term project support for the Isle of Wight population rather than support a further release before sufficient learning is made. In particular we need to know how behavioural and feeding traits might change as birds start to breed. In addition we know that individual birds have already moved around the UK with one being resident in North Norfolk for several months. These birds may not breed in Norfolk for many years but they are increasingly likely to spend time there and in doing so deliver many of the intended outcomes of a specific release.

- Overall, if a licence was to be granted we would expect to see privately or Government funded insurance or compensation made available as a legal requirement. We would also expect to see mitigation measures and exit strategies documented in advance of any licence being granted.

Yours sincerely,

Phil Stocker
Chief Executive

cc: Giles Wagstaff, Natural England: giles.wagstaff@naturalengland.org.uk