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**DRAFT RECOVERY ACTION PLAN FOR OSPREYS
IN EUROPE AND THE MEDITERRANEAN REGION IN
PARTICULAR**

- SECOND DRAFT -

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*Prepared by
Mr Roy Dennis MBE*

on behalf of the Council of Europe

**DRAFT RECOVERY ACTION PLAN FOR OSPREYS (*PANDION HALIAETUS*)
IN EUROPE AND THE MEDITERRANEAN REGION**



Roy Dennis has been a professional ornithologist since 1959 and has worked on the conservation and protection of ospreys, among other species, since 1960. He is a world expert on the species and, after visiting reintroduction projects in United States in 1995, led the first European translocation of osprey to Rutland Water in England and subsequently gave advice and assistance to similar projects in Spain, Portugal, Italy and Switzerland. Since 1999, he has been active in the use of satellite tracking to study the migrations and ecology of ospreys in Europe and Africa.

A RECOVERY ACTION PLAN FOR OSPREYS (*PANDION HALIAETUS*) IN EUROPE AND THE MEDITERRANEAN REGION

EXECUTIVE SUMMARY

Request: At the French National Symposium on Ospreys at Orléans

Museum in September 2013, I presented a paper on the ‘Proactive recovery of osprey populations in the southern half of Europe including England and Wales’. Subsequently, Eladio Fernández-Galiano, Head of Democratic Initiatives Department of the Council of Europe, asked me to prepare a Recovery Action Plan for Osprey in Europe and the Mediterranean Region. This Plan concentrates on recovery actions rather than national action plans for countries with healthy populations.

The European osprey population is in two parts – healthy populations in northern Europe while the species is absent or in small disjointed populations in the southern half of the continent. There is potential for a major increase in distribution and population of ospreys south of the present main range in Europe. This document explores a vision for the recovery of the species using pro-active management techniques that have proved successful for ospreys. It recommends a programme of proactive recovery of breeding ospreys which could be guided by 6 targeted actions for regional workshops to plan for large-scale recovery.

OSPREY BIOLOGY AND DISTRIBUTION IN EUROPE

The osprey is one of Europe’s most iconic species, presently breeding mainly in the northern countries and occurring throughout Europe on migration to and from Africa. The osprey is a specialist fish-eating raptor. It is a large raptor with a wing span of 2 metres and a weight of 1.2-2 kg. The upper-parts are brown and the underparts white, with distinctive breast band and eye stripe. The species and its ecology are well described in Poole 1989, Cramp et al 1980, Saurola & Koivu 1987, Schmidt & Mebs 2005, Dennis 2008 and Mackrill 2013. Distribution of ospreys in Europe has been much influenced by humans. Northern populations are either stable or increasing but southern populations are small and disjointed. The species was originally widely distributed from the North African coast to the Arctic Circle, similar to the wide latitudinal distribution in North America. Human interference was most severe south of the northern populations. Some populations, south of the main breeding range, have grown in the last half century and reintroductions are starting to redress earlier losses.

In northern Europe, ospreys are migratory raptors, which return to breed after wintering in Africa or occasionally as far north as Spain and Portugal. The small numbers breeding in the Mediterranean region are less migratory. A typical pair returns to a large stick-built eyrie in a prominent position, mainly on trees, but also on man-made structures (pylons) and cliffs. The two adults return individually but if both survive they nearly always breed together at the same nest. Eyries can be very large and old, over a metre in height as well as diameter and 30 years or more of age. New eyries built by first-time breeders are smaller and more likely to be destroyed by gales.



Ospreys lay three eggs, although young females lay two eggs in their first breeding season. Hatching success is generally good nowadays, with the pesticide-related failures of the 1950s-60s no longer a problem. Males do all the hunting, while females defend the nests, carry out most of the incubation and feed and protect the young. There is much individual variation, with males ranging from very proficient hunters to below average providers of fish. There is evidence of a hierarchy at common fishing sites, which means the dominant males have a greater chance of successful fishing. Females also show variation in their ability to ward off intruder ospreys or other species and to care for their young.

The young fly at seven-eight weeks of age and are provided with fresh fish for a further five-six weeks by the male. The female leaves on migration about two-four weeks after the first flights of the young. The family breaks up with the chicks departing in line with age and condition, the male migrating once the smallest chick has departed.

Ospreys prefer to breed near other ospreys as they are semi-colonial and they fish at common feeding sites; males also have a strong natal philopatry and immature ospreys prefer to take over an established eyrie, rather than build a new one in a new locality. Ospreys feed exclusively on fish in freshwater lakes, reservoirs and rivers, in brackish estuaries and in the sea. They hunt a wide range of fish species.

In August through to October, northern European ospreys migrate to Africa; the western populations to West Africa and some of the eastern ones to East and South Africa, while others winter in a spread across African states. Small numbers winter in southern Europe. In winter, ospreys live on sea coasts, estuaries and freshwaters, but there is a greater use of salt water fish. They live as individuals at the same favourite wintering location each winter, within groups of wintering ospreys centred on the richest feeding areas. Adults generally prevent juveniles from living in and using the best fishing locations. Adults return north in March and April, sub-adults in April and May, while most one-year-old ospreys remain in the wintering areas.



PRESENT DISTRIBUTION AND MANAGEMENT IN EUROPE

The osprey distribution in Europe has been greatly influenced by humans. Northern populations are either stable or increasing but southern populations are small and disjointed. The species was originally widely distributed from the North African coast to the Arctic Circle, similar in some ways to the distribution in North America. Human interference was most severe south of the northern populations. Ospreys presently occur in 19 countries of Europe. Table 1 gives the most recent population totals and estimates, published in the Journal of Raptor Research (Schmidt, Dennis & Saurola, 2014), and with some updated totals. The population estimate for Europe is between 9,400 and 11,500 pairs; approximately 90% of the population is located in five northern countries – Sweden, Russia, Finland, Norway and Germany.

Table 1. Numbers of osprey pairs in Europe and their population trends

+ increasing; – decreasing; ± stable; ? trend unknown.

Nations with known breeding populations listed in alphabetical order. For Russia only the European part is considered.

Country	Number	Years	Trends	Reference
Armenia	1–4	1999–2002	–	BirdLife Inter 2004
Azerbaijan	0–5	1996–2000	±	BirdLife Inter 2004
Belarus	150–180	1998–2002	±	Dombrovski & Ivanovski 2005
Bulgaria	3–6	2007	–	Iankov 2007
Denmark	3	2012	±	J. Tofft pers. comm., Bomholt and Novrup 2004
Estonia	50–60	2006	+	Männik 2006
Finland	ca. 1300	2010	±	Saurola 2011
France (cont)	38 - 50	2015	+	R. Wahl pers. comm.
Corsica	38	2011	+	J.-M. Dominici pers. comm..
Germany	630	2014	+	D. Schmidt pers comm
Italy	3	2015	+	A. Troisi pers. comm.
Latvia	180–200	2007–09	+	A. Kalvans pers. comm.
Lithuania	20–30	1998–2008	±	B. Sablevicius pers. comm
Moldova	0–2	1990–2000	?	BirdLife International 2004
Norway	500	2012	+	T.Nygård pers. comm
Poland	24–29	2009	–	Neubauer 2011
Portugal	1	2015		Palma pers comm
Russia	2000–4000	2004	± (-)	Mischenko 2004
Spain: Andalusia	13	2013	+	E. Casado pers. comm
Balearic Islands	20	2013	+	R. Triay pers. comm.
Sweden	4100	2010	±	Ottosson et al. 2012
Ukraine	1–2	2013	–	V. Grishchenko pers. comm.
Scotland	ca. 280	2014	+	R. Dennis pers. comm
England	16	2015	+	T. Mackrill pers. comm
Wales	4	2015	+	R.Dennis pers.comm
Total	9375-11486			

Table 1 shows clearly that ospreys are faring very differently in different regions of Europe and it is wise to look at them separately, because the conservation needs and threats to the populations are quite different.

HISTORY IN EUROPE

In 1960, Voous gave the world distribution as approximately 20° N to 65° N in America, discontinuously from 35° S to 65° N in Australasia and Asia but in Europe there was an unusual pattern of scarce breeding in the Mediterranean separated from a widespread distribution in northern Europe. He said that the osprey is lacking in much of Europe where it must have been exterminated by man. Dennis (2005) noted that the range loss in the British Isles and Southern/Central Europe mirrored the Catholic countries and postulated that ospreys and white-tailed eagles (*Haliaeetus albicilla*) in south and west Europe, including the British Isles, were subject to even higher levels of persecution than other raptors because they raided fish ponds in a period (Middle Ages) when the eating of fish on Fridays by humans was of great importance for religious purposes. They were also easier to eliminate than other raptors, because they generally nested near water, built obvious eyries and were less shy.

For example, the history of the osprey in the British Isles is in two distinct parts. There is a relatively detailed written knowledge of the decline of the species during the 19th and early 20th centuries, with the loss of the last pairs being due to the collecting of skins and eggs for museum and private collections. Similar losses also occurred in mainland Europe, for example Switzerland. However, evidence of the widespread range of the osprey throughout the British Isles in the first half of the last millennium has to be based on place-names, cultural and historical references and the ecology of the species. The drastic loss of range in the Middle Ages was most likely due to intense human persecution as well as some habitat loss. The osprey should be widely distributed from North Africa to the Arctic Circle.

Northern populations

8,530 -10,530 breeding pairs are estimated in this region. The population in Finland, approximately 1,300 pairs, is very well monitored and the population is regarded as stable. The estimate of 4,100 pairs in Sweden is the result of the survey in 2010; the population is thought to be stable but in large populations this is more difficult to ascertain. The Russian total of between 2,000 and 4,000 pairs is from 10 years ago when the population was thought to be stable or possibly declining. The osprey is increasing in Norway and the estimate in 2014 was 630 pairs. The German population is increasing and well studied; and in recent decades there has been a spread from Northern Germany as far south as Bavaria.

Mid-latitude western populations

The most noticeable change in this region is the recolonisation of the UK, with numbers in Scotland rising from one pair in the 1940s and 1950s to nearly 300 pairs in the present day, and recolonisation of England in 2001 and Wales in 2004. On mainland Europe, a pair of ospreys was found in the Orléans region of France in the 1970s and subsequently increased, with the French population now at 38-50 pairs. A small number of pairs also started to breed in Denmark.

Eastern Baltic/Middle Europe populations

An increasing population is located in the Baltic states, with approximately 200 pairs in Latvia, 60 pairs in Estonia and 30 pairs in Lithuania. On the debit side, the population in Poland is declining and is now below 30 pairs. Further east there are 150 to 180 pairs in Belarus, 1 to 2 pairs in the Ukraine and possibly single pairs in Moldova.

Southern Europe populations

Remnant populations survived in the Mediterranean region on Corsica, now at 38 pairs and increasing, and on the Balearic Islands, now 20 pairs and increasing. On the North African coast, recent estimates of 9 to 15 pairs in Algeria, 22 pairs in Morocco and a single pair on the Chafarinas Islands. There are now 15 pairs in mainland Spain, in Andalusia, the result of the reintroduction project with birds from Germany, Scotland and Finland, and three pairs in Tuscany, Italy, the result of the translocation of young from Corsica.

Eastern and south-eastern Europe populations

Breeding ospreys are very scarce or absent in this region with just 3 to 6 pairs in Bulgaria, 1 to 4 pairs in Armenia and between 0 and 5 pairs in Azerbaijan.

There have been dramatic improvements in osprey populations in the last half-century but it remains a fact that the species is still absent from about half of its ancestral range in Europe. Table 2 illustrates the loss in range.

Table 2. European countries with no breeding ospreys. (Data still being collected)

Country	Last bred	Comments
Albania		
Andorra		
Austria	1932	
Belgium	Early 20 th C	Recent attempt
Bosnia & Herzegovina		
Croatia		
Cyprus		
Czech Republic	1850s	
Georgia		
Greece	1966	
Hungary	18 th C?	
Iceland		Vagrants outside range
Ireland	18 th C	
Kosovo		
Liechtenstein		
Luxembourg		
Macedonia	1940	
Malta		
Monaco		
Montenegro		
Romania	1961	Pair attempted nesting
San Marino		
Serbia		
Slovakia		
Slovenia		
Switzerland	1911	Reintroduction started 2015
The Netherlands		
Turkey	Late 1960s	Recent attempt

With the exception of Iceland and a few other very small countries, ospreys should be breeding over a much larger area of Europe. There is no doubt that range recovery would be highly beneficial to European ospreys. A larger and more widespread population would reduce the species' vulnerability to future changes in weather, climate, contamination and variations in food supply.

PRESENT CONSERVATION IN EUROPE

The osprey is legally protected throughout Europe, often at the highest levels of national protection. The species is on annex 1 of the EU Birds Directive, annex III of the Bern Convention, annex II of the Bonn Convention and Appendix II of CITES. Under the EU Habitats Directive, special protection areas (SPAs) have been designated for ospreys; the species is classified as Least Concern (LC) on the IUCN Red List.

The osprey is an iconic charismatic species and is very popular with the general public throughout Europe. In consequence it is a well-known bird and its conservation is well understood and agreed. Not only is the osprey legally protected but people are prepared to accept it within the landscape, even in highly-populated areas.



People on an osprey cruise on Rutland Water

In the last century, much effort went into protecting the species from illegal persecution and from the illegal collecting of its eggs. Positive measures included protecting the actual nest sites from disturbance and human management activities, such as forestry and road building. This often led to individual ornithologists taking great interest in individual pairs, which might then involve making nest trees difficult to climb, to protect against egg thieves, and repairing nests that had been damaged by storms. A very important method of increasing population and distribution has been the building of human-made nests which ospreys readily occupied, but mainly in regions where ospreys were already present.

As the species has increased in Europe and persecution has declined, the bird has become more tolerant of humans and, as in the USA, has started to nest near to people. Once established in such areas, ospreys are often carefully protected and breed successfully. Consequently, they become more tolerant of humans and can increasingly accept people closer to their nests and feeding areas. They are capable of nesting on human-made structures, such as pylons, buoys and piers, as well as accepting artificial nests.

In Scotland, some ospreys are now breeding successfully within 50 metres of regular human presence, quite unlike 40 years ago when they were regarded as shy birds, living in remote locations. This change in behaviour of both people and birds allows a re-assessment of very large areas of European landscape previously thought unsuitable for ospreys.

MIGRATIONS AND WINTERING OF EUROPEAN OSPREYS

The migrations and winter distribution of northern ospreys has been well documented over many decades through the use of bird ringing, especially the data for Sweden, Finland, Germany and Scotland. Migration in spring and autumn is on a broad front with no concentrations at short sea crossings, used by raptors such as honey buzzard, in southern Spain and the Bosphorus. These studies have demonstrated that the westernmost breeding ospreys, e.g. those in Scotland, winter in western West Africa, particularly Senegal, The Gambia and Guinea Bissau, while some of the easternmost breeding individuals in Finland migrate on an eastern route with some wintering south to South Africa. There is a spread of wintering sites south and east in West Africa to Nigeria and in some central states.



Migrations tracked by GPS transmitter – spring track yellow and red track autumn

Satellite tracking studies, since 1999, have refined the ringing data knowledge, especially since the advent of GPS transmitters in the mid 2000s. This research has identified the importance of regular stop-over locations used by individual ospreys, and also the fact that, in general, adult ospreys return to exactly the same wintering sites throughout their lifetime. Adult ospreys use the best available coastal and estuarine locations, where fish is plentiful, for example the Sine Saloum National Park in Senegal. Juvenile ospreys tend to be excluded by the adults from these optimum habitats and range through a series of less good locations, for example inland freshwaters, including temporal wetlands. These fishing opportunities can be lost when pools dry out in years of lower rainfall. The ospreys may also use areas irrigated for crops such as rice.

THREATS TO OSPREYS IN EUROPE AND OTHER ISSUES

In general threats to ospreys in Europe are not causing declines in the population, with the exception of Poland. Natural losses are principally weather-related through death of young in nests in bad weather and from active eyries being destroyed by strong winds. Natural predators include eagle owl and goshawk, preying on young, and pine marten taking eggs. Deaths also occur from fighting between adults competing for nests. Non-natural losses are caused by collisions with and electrocutions from electricity power lines, by entanglement in mono-filament nets covering fish ponds and from fish hooks and nylon fishing line. Illegal shooting by humans is a problem in some locations, e.g. Malta, but because the species does not concentrate in specific sites this is a less a problem than with some other raptors. Occasional illegal killing by fish farmers or fishing interests undoubtedly takes place in some countries. There are no present toxic chemical alerts for osprey breeding performance.

Natural mortality on migration includes losses due to bad weather on migration, causing birds to be lost over the Atlantic Ocean or the Mediterranean Sea, or to die due to being grounded in locations with little food. Deaths also occur during the several days crossing the Sahara Desert, especially among juveniles failing to navigate successfully. Juvenile ospreys in Africa may die due to a lack of fishing opportunities caused by dominance from adults. Predation of ospreys occurs on migration and in winter in Africa from native species including crocodile, jackal and eagle owl.

In Africa ospreys can be killed in monofilament nets and in scrap netting abandoned in freshwater and the sea. Some ospreys may be targeted and captured by boys for sport around harbours and river settlements.

There is an increasing dialogue between people in Europe and Africa, and this has been enhanced by flyway cooperation in schools using tracked birds and the internet, on both the western and eastern flyways. This may reduce indiscriminate killing: see the work of Tim Mackrill at Rutland Water (www.ospreys.org.uk/world-osprey-week). On an official level the CMS Migratory Raptors Convention came into being in 2013 and osprey is a key species in this programme.

There is a need to have a better understanding of the numbers and distribution of European ospreys in Africa and to understand the conservation issues. There should be better cooperation between states with breeding and wintering ospreys. Fishing activities by European countries off the African coast will probably cause problems in the future and is probably already doing so; firstly for the indigenous coastal fishermen and then as they have to concentrate more on inshore fish, bringing possible knock-on impacts on food availability for wildlife, including ospreys.

RECOVERY PROJECTS UNDERTAKEN TO DATE IN EUROPE

Osprey reintroduction and translocation was pioneered in North America from the 1970s to restore populations exterminated or severely reduced by DDT poisoning in the 1960s (Poole 1989). The first project in Europe was at Rutland Water Nature Reserve, in Central England, in 1996-2001 (Dennis 2008 & Mackrill 2013). This has been successful with 102 young being reared between 2001 and 2015, when eight pairs bred. The English translocation also resulted in the recolonisation of Wales in 2004, where 4 pairs bred in 2015, rearing 11 young.

The next reintroduction project was carried out in Spain at two sites in Andalusia from 2005 and that population reached 15 nesting pairs in 2014. A translocation of young ospreys from Corsica to a release site in Tuscany, Italy, resulted in successful recolonisation, with two pairs breeding in Italy in 2014.

Two further reintroductions are active in southern Europe. A translocation of young ospreys from Finland and Sweden to eastern Portugal commenced in 2011; in 2015 it was proved that a pair of ospreys bred at a coastal location last used in 2001. A translocation of young ospreys from Scotland to the Basque Country in north Spain started in 2013 and a project started in western Switzerland in 2015, initially using six young ospreys from Scotland. These are tentative but successful steps towards restoring breeding ospreys in the southern range of the species. The techniques are now well tested and have been shown to be successful.



Hacking cage and released young ospreys at Urdaibai Biosphere Reserve

AN ACTION PLAN FOR OSPREYS IN EUROPE

The species is classified as Least Concern (LC) on the IUCN Red List and this clearly relates to the state of the populations in the northern countries. In consequence it is not at present appropriate to produce a common action plan for all of Europe. Instead, countries may wish to produce their own national action plans. In the immediate future there are two areas of proactive action which are sensible: firstly, to address the absence or low numbers of breeding ospreys in the southern half of Europe and, as a special case, to encourage Polish ornithologists to investigate the decline in Poland and identify methods to reverse it. .

The key area of activity is to promote a recovery plan for breeding ospreys in those countries of Europe where the species is absent or in small numbers. The following sections offer guidance for an **Osprey Recovery Plan for western, southern and eastern Europe.**

POTENTIAL FUTURE DISTRIBUTION AND NUMBERS OF OSPREYS IN EUROPE

The most glaring fact about the distribution and numbers of ospreys in Europe is the difference in their status between the northern and southern countries. There is no reason why the osprey should not be a widely-distributed species in the southern countries of Europe, rather than being in the present disjointed distribution of small pockets of breeding pairs. Importantly, they could use biologically richer areas, such as coastal estuaries. The species could regain its original distribution from North Africa to the Arctic but there are various reasons why this is difficult. This plan attempts to raise these issues and address them, although it is important to recognise that there are different management requirements in different regions of Europe.

As long as people accept them without persecution, ospreys are able to exploit areas with richer food supplies, often near humans, and thus increase breeding productivity, population size and range more quickly. It is important to note that the documented historical range of remnant populations was often a reflection of refugia of low persecution rather than solely an indicator of high quality habitat or food.

What are the limiting factors to expansion?

Ospreys exhibit a low ability to recover lost range, with a natural average spread of less than five kilometres per year over time. In North America, following the huge losses due to pesticide poisoning in the 1950s and 1960s, this was overcome by a series of translocations involving the hacking of young.

Natal philopatry, range expansion and establishment of ‘colonies’

It is well-known in Europe, that male ospreys prefer to breed near their natal site while females may breed anywhere within the population, occasionally including over long distances, even between Sweden to Scotland, northern Germany to France. When a pair of ospreys move to a new locality in an expanding population, rarely more than 50 kilometres from the present breeding range, new pairs join them to establish a loose ‘colony’. If they are not joined by other pairs within a period of several years, the chances are that the pioneering pair will not establish a new ‘colony’ and on the loss of one or both of the original adults, the colonisation attempt fails. The growth of each new ‘colony’ is slow at the outset but, if successful, it rapidly increases and then levels out. In some case it may even decrease.

Despite these old established ‘colonies’ being full, there is still much competition by young potential breeders to join them. An examination of colour-ringed breeding adults in Northern Scotland over many years showed that annual survival was 91%. This means that on average in a ‘colony’ of 10 pairs of ospreys there is only a requirement for two new replacements per annum, yet we regularly record many intruders at nests within these areas. Non-breeding intruders often visit nests containing pairs throughout the nesting season. Sometimes these visits can be surprisingly aggressive and can result in broken eggs or even the eviction of resident adults. Ospreys may even be killed during these fights. Field research has also shown high degrees of interference by intruders which could be causing density-dependent effects.

Age of first breeding

Ospreys normally breed at three years of age and in the early years of population growth, breeding at three or four years is normal. Ospreys can breed at two years but it is very unusual. In established 'colonies' more individuals are forced to delay first breeding and this is believed to be linked to birds being intent on breeding within established 'colonies', rather than moving to unoccupied regions. For example, the following table demonstrates the delay in breeding.

Age of first breeding in an older 'colony' in Scotland (Dennis 2005)

	3 years	4 years	5 years	6 years	7 years
Male	4 (1 NB)	12	6	2	2
Female	11	7	8	4	1

This failure to breed at the earliest opportunity is also shown in an examination of non-breeding intruders at established nests. At the famous Loch Garten nest in the Scottish Highlands, for example, 11 colour ringed birds of three years of age in the Badenoch and Strathspey population had not found their way into the breeding population, five of four years of age, two of five years and four of six years.

What is clear is that many ospreys are now not breeding when first mature and capable of doing so. They are waiting until later to find a place within a favoured 'colony', usually due to the death or non-return of an older bird at an established nest. Each delayed season for an individual means a 9% chance of dying before the next breeding attempt. This is due to the fact that average annual survival of adults is approximately 90%. A bird failing to establish itself until its fourth, fifth, sixth or seventh year therefore has a greater chance of death before breeding successfully, an additional 9%, 18%, 27% or 36% chance respectively of dying. Females are most productive in the early years of their breeding life, so this failure to start breeding has a double disadvantage. Earlier research in North America showed that the mean age of first breeding in an expanding population in New England was 3.6 years, but in an established population in Chesapeake Bay was 5.7 years (Poole, 1989).

In many areas, the productivity of translocated populations throughout Europe may well be higher than donor populations. So not only do translocations have the potential to enable translocated birds to breed earlier, but also to breed more productively. This has the effect of increasing the overall population more rapidly.

MANAGEMENT TECHNIQUES FOR RESTORING BREEDING OSPREYS

Artificial (human-made) nest building

Artificial nest building increases breeding success and productivity, and range expansion. It is most effective in extending the edges of breeding areas and creating intermediate nesting locations between established 'colonies'

This technique has been widely used in Europe, especially Finland, Germany and UK, for a variety of reasons, some as above, but also to encourage the birds to nest in forests where harvesting operations leave very few large or damaged-topped trees suitable for ospreys. In some countries this can mean that many of the nests have been built by ornithologists in commercial forests with unsuitable trees. Nests have also been built on poles and platforms in areas with few suitable trees, such as marshlands and agricultural areas. Proactive management of pairs/nests is essential to optimise production of young to increase the breeding population.



Man-made nest at Rutland Water reservoir in England

Of course ospreys can build their own nests, but in stable populations and ‘colonies’ most ospreys choose to breed for the first time in an old established nest that is vacant or, ideally, occupied by a bird of the opposite sex which has lost its mate. The natural behaviour of ospreys then is to look for big old nests rather than build their own. If ospreys have been exterminated from a region the lack of ‘old nests’ is a disincentive for ospreys to stop and breed. For that reason, the building of artificial nests is an important management tool for recovery. These man-made nests must be very well built in the best sites, must replicate previous use by ospreys and be regularly monitored and repaired.

Translocation, reintroduction and recovery

The preference to breed in established but saturated ‘colonies’ and to delay the age of breeding suggests that it is not only good management practice to translocate young ospreys to new areas of the extinct range but that it also gives individuals greater opportunity to breed at an earlier age and have greater lifetime reproductive success by breeding in new localities. It also removes some of the potential future intruders from saturated ‘colonies’.

Leaving ‘excess’ young in full old established ‘colonies’ means that at these ‘colonies’ the age of first breeding is delayed, individual lifetime reproduction falls and breeding success declines due to intruder aggression and possibly through competition at fishing sites. There is no doubt that ‘pools’ of non-breeding intruders decrease breeding success within saturated ‘colonies’.

Reintroduction of raptors and other species to areas where the species has become extinct is now an accepted wildlife management practice throughout the world. Osprey reintroduction and translocation was pioneered in North America from the 1970s, and is increasingly being used in Europe.

Translocations, artificial nest building and nest manipulation (supplementing broods of remote pairs with translocated young) are the key to proactive range recovery. ‘Colonies’ reaching their peak are the best sites to provide donor young and because of natal philopatry and delayed breeding age, the removal of young has little effect on local populations. Furthermore, removal of young birds from areas that have reached carrying capacity reduces negative density dependent effects. The translocated birds in new areas may breed from three years (a few at two years) while in full ‘colonies’ first breeding may be delayed past three years to 4 - 7 years. Pioneering and isolated pairs should be enhanced by fostering chicks to ensure maximum brood sizes (as was successfully carried out in Andalusia) and by small translocations, otherwise they may fail. Translocation projects can be reduced in cost and effort as techniques become well proven.

There is a tendency to be very conservative with regard to taking young, under licence, from donor populations for translocation projects. An investigation of the biological facts shows that quite high numbers can be collected. In a ‘stable’ population of say 100 pairs of breeding ospreys, the annual mortality of adults per annum would be 18 individuals (9% mortality) from the 200 adults. Thus each spring there is a requirement for 18 new breeders to join the population. Average annual breeding success for Scottish and northern European populations is approximately 1.35 young per all

nesting pairs, which is a total of 135 young reared annually. 60% or more of young ospreys die before reaching breeding age, so from the annual production of young, 54 potential breeders should return. Taking a lower survival rate of 35% rather than 40% this is still 47 birds. Not all young return to their natal area but in large overall populations it is possible to predict that there is a general surplus of 29 – 36 individuals in any area, holding 100 pairs, in order to keep the population stable. Donor populations can therefore provide up to 30 young per 100 pairs for translocation projects without causing reductions.

Difficulties encountered in the translocation of ospreys

Osprey translocations have attracted some opposition from conservation bodies and ornithologists but not from the general public. The key objections are, 'Why not leave it to natural spread?', 'It will damage the donor population' and 'It will be expensive and take away much-needed money from more important conservation'. This last point also involves the fact that the osprey in Europe is presently classed as an IUCN listed species of least concern.

It has been proved that natural spread in some raptors, like the osprey, is very slow, whereas with more mobile species, such as the peregrine falcon, rapid recolonisation of lost range can take place, as with, for example, the return of the peregrine to all of the United Kingdom after the banning of the persistent pesticides in the 1960s and 1970s. Ornithologists have scientifically examined the issue of removing young from donor populations and found that it was difficult to detect any effects on the population of the removal of small numbers of chicks from the population. This has been examined by Dr M. Marquiss (ITE, 1996) for the Rutland project and by Dr P. Whitfield (SNH, 2004) for the Spanish project. Such effects are even more difficult to observe in the field because the 'colony' effects described above distort recruitment and breeding success.

It is also a fact that the removal of birds from an area does not remove the birds from the total population but simply redistributes them. Opposition may involve local and national eco-politics, while the claim that osprey projects take money away from more 'worthy' conservation is not proven, because donors do not necessarily behave in a way we expect: the iconic osprey may attract donors who do not normally support conservation projects. Experience of osprey translocation projects developed over the past twenty years in Europe (and longer in North America) demonstrates that such projects can be reduced in both cost and effort as techniques become more accepted.

The collection and translocation of young ospreys is a time-consuming and quite difficult task for raptor workers at a busy time of the year. In consequence, some people may agree to carry out one project then wish to have a rest from further activity. In consequence there is a need to have a greater pool of potential helpers to carry out the fieldwork, collection and care prior to translocation. Assistance and funding from the receiving country is essential. Regulations are making the task more onerous and time consuming than in the past. It would be useful to hold a workshop on the provision of donor young and how to make the system more efficient, recognising the overarching importance of the care and welfare of the young ospreys.

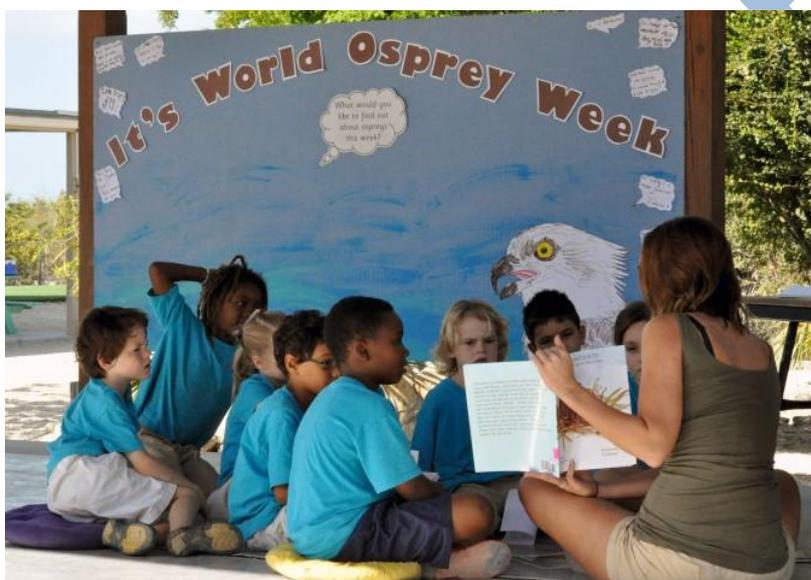


Successful nest site at Rutland Water population with three young

OSPREYS AS A FLAGSHIP SPECIES

In some parts of Europe – particularly in the UK and Finland – ospreys generate widespread interest among the general public. In some areas they have become vital to the rural economy through increased tourism revenue. For instance a single osprey nest in Cumbria, England is estimated to contribute in excess of £2 million to the local economy every year. Although the impact of newly-established osprey populations will vary between different European countries, the economic benefits of restoring the species to other parts of its former range could be considerable.

In addition to the potential economic impact, flagship species such as the osprey can play an integral role in raising the profile of nature conservation. As such, the proactive conservation of ospreys in parts of western and southern Europe has benefits beyond simply restoring the osprey to its former ancestral range. Recent efforts to link schools along the migratory flyways of ospreys demonstrate the potential of this iconic bird to help establish important and meaningful links between European countries and further afield (www.ospreys.org.uk/world-osprey-week).



Children learning about ospreys in World Osprey Week

RECOMMENDATIONS FOR FUTURE MANAGEMENT PROPOSALS FOR OSPREYS IN EUROPE AND THE MEDITERRANEAN REGION

The osprey's future in Europe varies between different regions and therefore the management proposals are therefore different. The aim of this document is to encourage individual countries to review the conservation requirements of ospreys, nationally and as part of an overall European conservation plan.

In countries with depleted or no breeding osprey.

A proactive series of artificial nest building, translocations and the supplementing of pioneering pairs in Europe, south of a line from the Netherlands to Hungary, would enhance the recovery of the osprey as a breeding bird in southern Europe. In France, for example, young from the Orléans region could be translocated to other parts of the country, including coastal and estuarine areas with rich stocks of mullet. This would build on the initial translocations to England, Spain, Italy and Portugal. Increasing numbers of ospreys migrate from the northern countries over the south but do not presently stop to breed, but there is always the potential for some to join southern colonies as they become established. In this way, the southern European population could increase more rapidly from roughly 150 pairs to several thousand pairs or more

The European Habitats Directive encourages member states to examine the opportunities for active restoration of regionally extinct species. In conclusion, there would be benefits in promoting an initial joint program of recovery for the osprey in western, southern and eastern Europe. As already discussed, translocation techniques for the species are now well-understood with a proven track record

of success. Furthermore the established populations of Northern Europe – many of which have reached carrying capacity – have the potential to provide ample donor birds. This would enable a series of translocation projects to be undertaken in a highly strategic and cost-effective way across much of southern Europe.

The potential size of the European population is speculative but could be as high as double the present population of approximately 10,000 pairs, mainly distributed in Sweden, Finland and European Russia, if the full ancestral range were reoccupied. In 1996, Saurola and Schmidt showed that 93% of Europe's ospreys bred in northern and north-eastern countries, with 6% in central Europe and 1% in the south.

In the British Isles, using our present knowledge and accepting that ospreys will change their behaviour; as in North America, and start nesting near to humans in new areas, it is reasonable to estimate potential populations of 500 pairs in Scotland, 800-1000 pairs in England, 100 pairs in Wales and 400 pairs in Ireland. This would be more than an 80% increase, which indicates how restricted is the present range and population in the British Isles. It may be possible to come up with a similar map-based estimate for southern Europe and the Mediterranean region.

A further series of translocations in Europe would mirror the approach that has been taken successfully in the United States with ospreys; and also that of another iconic species in Europe, the beaver (*Castor fiber*) which has been reintroduced to over 25 European countries.



Building man-made nest in Urdaibai Biosphere Reserve

LIST OF TARGETED ACTIONS

The following logframe outlines a series of objectives, actions and timelines for osprey conservation in individual countries and for regional groups of countries, aimed principally at the restoration of breeding ospreys in the 'lost' breeding range. It is followed by a list of targetted actions aimed at cooperative action.

List of concerned countries	Estonia, Finland, Germany, Latvia, Lithuania, Norway, Sweden, Scotland (UK)			
Objective	Action(s)	Priority	Timeline	Comments
Maintain and conserve breeding osprey populations in northern Europe	Continue high quality monitoring	Medium	Continuing	
	Explore potential for enhanced collection of donor young for translocations to southern Europe	High	2015 onwards	See Targetted Action (f)
	Maintain alert for threats and problems	Medium	Continuing	

List of concerned countries	Poland			
Objective	Action(s)	Priority	Timeline	Comments
Restore breeding osprey population	Investigate reasons for decline and carry out remedial osprey management	High	2015 onwards	See Targetted Action (e)

List of concerned countries	France (Corsica & Southern Departments), Italy (western), Morocco, Portugal, Spain, Tunisia			
Objective	Action(s)	Priority	Timeline	Comments
Continue the restoration of the breeding populations of ospreys in western Mediterranean to pre-persecution levels	1. Enhance the conservation of small populations of ospreys	High	2016 onwards	
	2. Enhance the management of pioneering pairs	High	2016 onwards	
Pro-active recovery of breeding ospreys to suitable breeding areas	1. Formulate national recovery programmes	Medium	2016-2018	See Targetted Action (a)
	2. Build man-made nests to encourage pioneering pairs, to expand the range of small populations and to link sub-populations	High	2016 onwards	Cooperate with neighbouring countries
	3. Prepare recovery project proposals and where appropriate translocate and release young ospreys to create new populations.	High	2016 onwards	

List of concerned countries	Austria, Belgium, Denmark, France, Germany (southern States), Ireland, Luxembourg, Netherlands, Switzerland, United Kingdom (except Scotland)			
Objective	Action(s)	Priority	Timeline	Comments
Restore the breeding populations of ospreys in western and central Europe to pre-persecution levels	1. Enhance the conservation of small populations of ospreys 2. Enhance the management of pioneering pairs	High High	2016 onwards 2016 onwards	
Pro-active recovery of breeding ospreys to suitable breeding areas	1. Formulate national recovery programmes 2. Build man-made nests to encourage pioneering pairs and to expand the range of small populations 3. Prepare recovery project proposals and, where appropriate, translocate and release young ospreys to create new populations	Medium High High	2016 – 2018 2016 onwards 2016 onwards	See Targetted Action (b) Take guidance from reintroductions already undertaken in Europe and cooperate with neighbouring countries

List of concerned countries	Bulgaria, Czech Republic, Georgia, Hungary, Republic of Moldova, Romania, Serbia, Slovak Republic			
Objective	Action(s)	Priority	Timeline	Comments
Restore breeding populations of ospreys in eastern Europe	Enhance the management of pioneering pairs	High	2016 onwards	
Pro-active recovery of breeding ospreys to suitable breeding areas	1. Formulate national recovery programmes 2. Build man-made nests to encourage pioneering pairs and to expand the range of small populations 3. Prepare recovery project proposals and, where appropriate, translocate and release young ospreys to create new populations	Medium High High	2016-2018 2016 onwards 2016 onwards	See Targetted Action (c) Take guidance from reintroductions already undertaken in Europe and cooperate with neighbouring countries

List of concerned countries	Albania, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Malta, Montenegro, Slovenia, The former Yugoslav Republic of Macedonia			
Objective	Action(s)	Priority	Timeline	Comments
Restore breeding ospreys in south-east Europe and the eastern Mediterranean region through pro-active recovery to suitable breeding areas.	1. Formulate national recovery programmes 2. Build man-made nests to encourage pioneering pairs to settle and breed 3. Prepare recovery project proposals and, where appropriate, translocate and release young ospreys to create new populations.	Medium High High	2016-2018 2016 onwards 2016 onwards	See Targetted Action (d) Take guidance from reintroductions already undertaken in Europe and cooperate with neighbouring countries
List of concerned countries	Malta			
Objective	Action(s)	Priority	Timeline	Comments
Removal of threat to migratory and breeding ospreys in the Mediterranean Sea.	Enforce protection status of migratory ospreys by enhanced wildlife crime prevention	High	Immediate	Ospreys may become a breeding species in the area in the future

LIST OF TARGETED ACTIONS

I recommend the following actions to ensure the proactive recovery of the osprey as a breeding species throughout the ancestral range in Europe. It is a programme requiring cooperation between the European states.

- a. Organise an osprey workshop in the western Mediterranean** to review the reintroduction projects (Spain, Italy and Portugal), discuss the present growth and potential populations and plan further recovery of breeding ospreys in this region. Potential attendees would come from Spain, Portugal, the southern French coast, Italy, Mediterranean islands and North Africa.
- b. Organise an osprey workshop in western/central Europe** to review the reintroduction projects (UK and Switzerland), discuss present growth and potential population and plan further recovery of breeding ospreys in this region. Potential attendees would come from UK, Ireland, France, the Netherlands, Belgium, southern Germany, Switzerland and Austria.
- c. Organise an osprey workshop in eastern Europe** to review the potential for the recovery of breeding ospreys in this region and agree a programme of actions. Potential attendees would come from Hungary, Czech Republic, Slovakia, Serbia, Romania, Bulgaria, Moldova and Ukraine.
- d. Organise an osprey workshop in south-eastern Europe** to review the potential for the recovery of breeding ospreys in this region and agree a programme of actions. Potential attendees from Greece, Albania, Croatia, Slovenia, Macedonia, Montenegro, Kosova, Bosnia, eastern Italy and including the eastern Mediterranean islands.
- e. Give support to Polish ornithologists** to carry out studies and plan remedial actions to halt and reverse the decline of breeding ospreys in Poland.
- f. Organise an osprey workshop in northern Europe** to discuss the potential for providing more donor young for osprey recovery programmes in southern Europe.

Appendix

Table 3. Nearby countries with populations which may interact with European breeding populations.

Country	Number	Years	Trends	Reference
Algeria	9–15	1989–93	+–	Isenmann and Moali 2000
Morocco	22	2013	+–(-)	I. Cherkaoui pers. comm
Spain. Chafarinas Islands	1	2008	+–	Triay and Siverio 2008
Total	32-38			

In 2014, it was reported that a colour-ringed osprey from Morocco had joined the new Andalusian breeding population.

Table 4. Countries with ospreys in Palaearctic Region (outside Europe)

Country	Number	Years	Trends	Reference
Canary Islands	7	2013		D. Trujillo and M. Siverio pers. comm
Cape Verde Islands	72–81	2001	-	Palma et al. 2004
Egypt	150–180	1984–89		Fisher et al. 2001a
Totals	229-268			

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The internet now allows easy access to scientific papers on ospreys so I have decided to list just a few key publications. These also carry full lists of relevant scientific papers on ospreys.

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