URDAIBAI BIRD CENTER
ARANZADI SOCIETY OF SCIENCES

OSPREY RESTORATION PROJECT IN THE URDAIBAI BIOSPHERE RESERVE (BASQUE COUNTRY)

ANNUAL REPORT 2013

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SUMMARY

The osprey restoration program in the Basque Country started in 2013. The aim is to establish a founder population in the Biosphere Reserve of Urdaibai, which ultimately may help out the recolonization of estuaries and wetlands of northern Iberian Peninsula, thus promoting connectivity between the populations in Southern Iberia and continental France.

In 2013, under a licence from Scottish Natural Heritage, 12 nestlings were translocated from Scotland to a hacking tower located at the Biosphere Reserve of Urdaibai (Biscay, Basque Country). The birds were fed mainly with grey mullets caught in the estuary by the working team. During the stay in the hacking tower (14-29 days) no incidents occurred and all nestlings fed well and had a positive growth rate.

After release, the fledglings stayed c. 39.2 days around the release area, with increasing longer flights until final dispersal and the onset of migration. Five birds were fitted with a satellite transmitter (*Microwave* 30 g Argos/GPS Solar PTT).

One of the birds suffered a leg fracture after getting caught in a tree following its first flight with subsequent clinical complications and eventually died after three months of veterinary care. One of the satellite-tracked birds was electrocuted outside the Urdaibai Reserve during an exploratory flight just before starting migration. The other four satellite-tracked individuals crossed to Africa in September: one stopped transmitting near Marrakech (Morocco), two reached Mali, and other one arrived at the coast of Senegal. In January only the individual wintering in Senegal continued transmitting.

INDEX

1. Introduction

The first osprey reintroduction programmes were carried out in the states of Pennsylvania and Tennessee (USA), where a total of 110 and 165 chicks were released during the 1980s[1,2] Both projects were successful and by 1988 there were already 12 nesting pairs in Pennsylvania and 77 in Tennessee by 1996. Up to now there have been several reintroduction projects in twelve North American states and there are initiatives to extend the osprey population to the whole of the United States.

As a result of the success of the American reintroduction programmes, Poole[3] recommended the translocation of birds in Europe too as a method of extending populations and reducing their vulnerability. In Europe, the first reintroduction programme was one carried out in Rutland Water (England)[4]. Between 1999 and 2001, 64 chicks were taken from nests in Scotland, following the protocol carried out in the United States. In 2001 the first pair bred successfully in Rutland Water and five pairs nested in 2011; this translocation resulted in the return of the osprey as a breeding species in Wales (www.ospreys.org.uk). The second European project started in 2002 in Southern Spain, where 164 birds from Finland, Germany and Scotland were released during the period 2003-2012. In 2005 first breeding attempts were recorded, and in 2009 first breeding successes[5]. In 2013 a minimum of twelve pairs were breeding in the area (Migres foundation, *pers. comm.*). The third project started in Italy in 2003 with the building of artificial nests and the transfer of birds from Corsica to the National Park of La Maremma (Tuscany) in 2006[6]. Finally, another project started in 2011 at the Alqueva reservoir (Alentejo, Portugal) with the release of 10 birds, translocated from Sweden and Finland[7]. Therefore, there is a considerable amount of experience on the most appropriate and effective methods to conduct an osprey reintroduction program.

The restoration project of the osprey (*Pandion haliaetus*) in the Urdaibai Biosphere Reserve (Basque Country) is an initiative of the *Aranzadi Society of*

Sciences (www.aranzadi-zientziak.org) managed by the *Urdaibai Bird Center* (www.birdcenter.org) and is funded and supported by the Department of Environment of the County Council of Biscay and the Basque Government.

The program is developed under the guidelines of the *Osprey restoration project in the Urdaibai Biosphere Reserve*[8] and has been authorized by the Board of the Urdaibai Biosphere Reserve and the Wildlife Committee of the Spanish Ministry of Environment.

2. Objectives

The main objective of this project is to set up a reproductive population of ospreys in the Basque Country. It contributes to the following sub-objectives:

- To increase the osprey breeding range and promote the connectivity between French and Southern Iberian populations.
- To increase social awareness about osprey conservation and about biodiversity in general, using the process as a tool for education.
- To promote the image of the Urdaibai Biosphere Reserve and ecotourism.

3. Preparatory tasks

Following an initial feasibility plan written in 2009 by Roy Dennis and Aitor Galarza, a new 2012 feasibility plan for osprey reintroduction in the Biosphere Reserve of Urdaibai was sent for evaluation to Pertti Saurola (*Finnish Natural History Museum*) and Roy Dennis (*Highland Foundation for Wildlife*, in Scotland). Both experts visited Urdaibai, advised and gave approval to the project and its facilities, and made the necessary steps to obtain the pertinent licenses to collect ospreys in their respective countries.

In Scotland the *Scottish Natural Heritage* authorized the annual collection of twelve individuals while in Finland, the Häme and Pirkanmaa Environmental Centres

issued license for the annual collection of five nestlings. Finally, we decided to collect nestlings only from Scotland, given the logistical and financial difficulties to operate with two different countries. We also took into account the geographical position of Scotland, located almost at the same longitude as the Basque Country, which could favour the migratory orientation of individuals and thus increase the likelihood of return.

The osprey restoration program in the Basque Country has planned for the release of 12 fledging each year, for five consecutive years (a total of 60 fledging within the 2013-2017 period). One chick from broods of 2-3 nestlings in the donor population will be removed when they are about five weeks old. Chicks will be assessed on the basis of weight, size and plumage, and collected if they are in good body condition.

4. Infrastructures

4.1. **Hacking tower**

A hacking tower was built on a plot of 560 m^2, next to the marsh of Urdaibai. The tower is located at the edge of the forest, at about 50 m from the intertidal zone.

Figure 1. Hacking tower and control cabin

The tower was built along the same lines as those used in the projects of Andalusia and Portugal, previously visited by the staff of the working team. Before the start

of the construction, the plot was cleared of high vegetation, so that the entire front of the tower had good visibility.

The hacking tower has a height of 4 m and at the top it has a cage 8 m wide, 1.5 m deep and 1.5 m height, divided into four cages of equal size. Except for the back, all sides are lined with galvanized mesh. In addition, the lateral sides of each cage are covered with board up to 1 m, with the aim of avoiding eye contact between the groups of nestlings and reducing stress, which can also encourage cohesion between nestlings within the same cage.

The front part can be opened slowly by hinges and a counterweight that is operable from the back of the tower. The back is entirely covered with board and each compartment has an access door, two spyglass windows, two feed tubes and two holes for handling if necessary. The top is covered with a roof panel, with the aim of reducing the exposure of the nestlings to rain. The floor of each compartment is partially mobile, in order to facilitate removal of uneaten food and cleaning[9].

Within each compartment an artificial nest lined with woody material was built and a pair of trunks was installed for perches. At each compartment a security camera was installed and connected via fibre optics to the control cabin.

Figure 2. Controlling the nestlings in the cabin via infra-red closed-circuit television (CCTV)

The back is equipped with a covered balcony where project staff can comfortably move, access each cage to feed and observe the nestlings.

4.2. **Monitoring**

The behaviour of the nestlings was observed in each compartment by direct observation through spyglasses and also by the video cameras connected by wiring to the control cabin. The images were stored on a digital recorder.

4.3. **Control cabin**

At about 70 m from the hacking tower, a control cabin (9.2 m^2) was camouflaged with cryptic colours and decorated by a local graffiti group. The cabin was used to accommodate the viewing system of closed-circuit television (CCTV) and the materials needed for food processing and observation of the birds. The CCTV system was powered by wiring from a farmhouse located 200 m from the cabin. Outside the cabin, a table with a sink was installed, equipped with running water from the farmhouse, where all the food was processed.

A path from the control cabin to the hacking tower was built. Since the trail was only partially hidden by vegetation, we camouflaged it using shading mesh.

Figure 3. Ospreys in a feeder and on a perch, during the dependence phase

4.4. **Feeders**

Four feeders were installed on wooden platforms 1x1 m, erected on poles 2 m high. One was located about 25 m from the hacking tower and the other three

spaced about 100 m apart. The platforms were filled with fine branches and plant material and were used to feed the fledglings from their release until departure.

4.5. **Perches**

Twenty perches in the marsh next to the hacking tower were erected, using tree trunks and often beside tidal channels.

4.6. **Artificial nests**

The availability of sites that are suitable for nesting is one of the factors that may limit an osprey population[10,15], since it can be difficult for new breeding pairs to find suitable nest sites[14]. Moreover, given their semi-colonial behaviour and bearing in mind that ospreys are probably able to track the presence of con-specifics by watching their nests[16], the installation of artificial nesting structures may benefit natural colonisation in regions where they do not nest[17], and is an essential tool for any programme for reintroduction by translocation[18]. At the Urdaibai Reserve a total of five artificial nests (3 in the forest and 2 in the marsh) were built up in 2009 to attract sub-adult birds and thus try natural colonization of the area. During 2013, four additional nests were erected in the marsh (Figure 7). Marsh platforms were installed on poles 5-7 m tall with a metal platform 1x1 m that was filled with branches and fine plant material to form a nest with a minimum height of 0.5 m. On this platform a wooden perch 1.5 m long was also installed.

Figure 4. One artificial nest in front of the hacking tower: building up and two birds using it during the dependence phase.

Location of artificial nests was chosen on the following criteria:

- Minimum disturbance: distance from roads, inhabited buildings and busy paths >300 m.
- The place selected and its surroundings (>300 m) should be within the area of maximum protection in the Reserve (Special Protection Area).

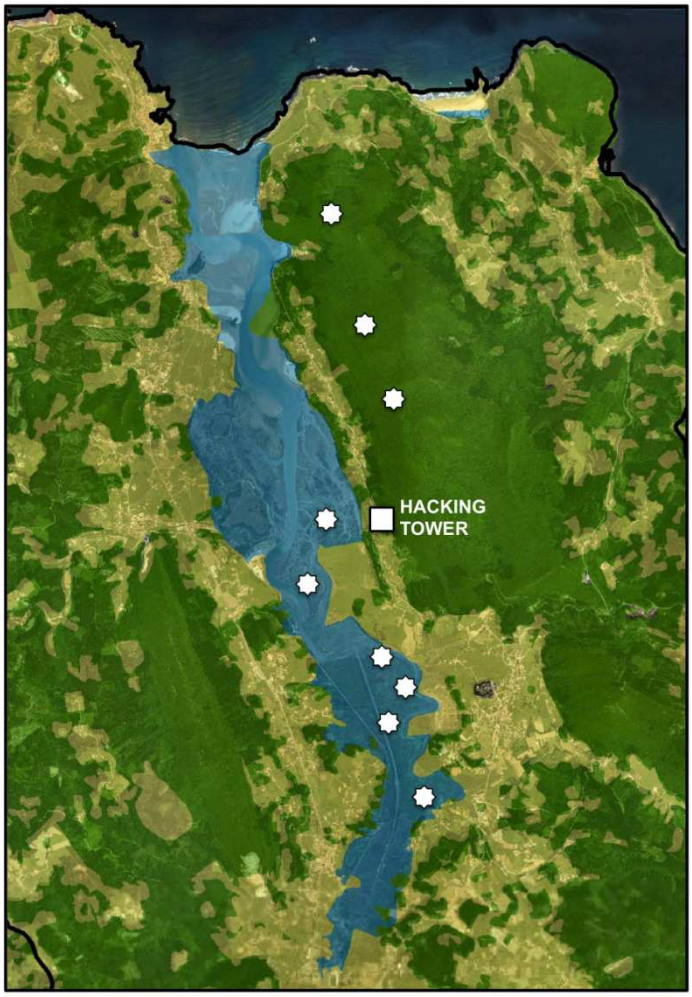


Figure 5. Location of artificial nests

5. Translocation

5.1. **Nestling collection and transportation**

Between July 5 and 8, twelve nestlings were collected in Moray and the Highlands (Scotland). This operation was conducted by Roy Dennis, Highland Foundation for Wildlife, and had the cooperation of several volunteers and the Forestry Commission Scotland. Nestlings were collected only from nests containing more than one chick and when body condition was good. Each nestling was weighed and measured (length of wing, tail and tarsus) *in situ*. After removal from the nest, nestlings were kept in four pens according to their age, and fed three times daily, at the headquarters of the *Highland Foundation for Wildlife*, located near Forres (Moray). They were identified with metal rings of the *Aranzadi Society of Sciences* and yellow colour PVC rings supplied by the *Doñana Biological Station*. While in Forres, nestlings were examined by Jane Harley, from the *Strathspey Veterinary Centre* (Grantown on Spey), certifying the good body condition and health of the individuals.

Figure 6. Collecting the ospreys in Scotland

On the morning of July 9, nestlings were taken in a van from Forres to Aberdeen airport, where they were fed before being transported to London by plane. They were inspected and fed once again in the *Animal Reception Centre* at Heathrow airport, an Agency of the City of London. From London the individuals were transported on another flight to Madrid. Finally, transportation from Madrid to the Basque Country was carried by van, arriving at the area of hacking in the morning

of July 10. During the transport operation, the birds were accompanied and examined by Roy Dennis (*Highland Foundation for Wildlife*) and Aitor Galarza (*County Council of Biscay*). On arrival, the veterinary service of the project examined the birds. All individuals arrived in good condition, although some of them had lost weight since their removal from the nest (Table 1).

Table 1. Weight of nestlings when collected from the nest, on arrival to Urdaibai and when fitted with transmitter in the hacking tower. The weight of three of them trapped after released is also showed.

Individual	Sex	Collecting	Arrival	Transmitter	Capture
P0 P00161	F	1780 g (05.07.13)	1550 g (10.07.13)	1750 g (22.07.13)	
P1 P00170	M	1440 g (07.07.13)	1350 g (10.07.13)	1400 g (22.07.13)	
P2 P00164	M	1400 g (06.07.13)	1250 g (10.07.13)	1300 g (22.07.13)	
P3* P00167	F	1700 g (07.07.13)	1550 g (10.07.13)	¿? g (01.08.13)	1900 g (05.09.13)
P4* P00163	M	1400 g (05.07.13)	1400 g (10.07.13)	1352 g (01.08.13)	1660 g (03.09.13)
P5 P00166	F	1600 g (06.07.13)	1400 g (10.07.13)	1868 g (01.08.13)	
P6* P00162	F	1500 g (05.07.13)	1600 g (10.07.13)	1940 g (04.08.13)	2080 g (03.09.13)
N1* P00172	F	1320 g (08.07.13)	1250 g (10.07.13)	1760 g (04.08.13)	1900 g (03.09.13)
N2* P00169	M	1300 g (07.07.13)	1300 g (10.07.13)	1360 g (04.08.13)	
N3 P00168	M	1260 g (07.07.13)	1150 g (10.07.13)	1320 g (04.08.13)	
N4 P00165	M	1300 g (06.07.13)	1300 g (10.07.13)	1614 g (08.08.13)	
N5 P00171	M	1050 g (08.07.13)	1100 g (10.07.13)	1491 g (08.08.13)	

* individual with PTT

5.2. **Pre-release phase**

Each cage held three nestlings that were grouped according to their plumage development. Before placing them in the cages nestlings were fed with 10-15 pieces of sardine. All individuals fed by their own from the first day.

Birds were fed four times daily. The food was pre-weighed and the amount of food consumed was noted. At first the fish were given in small pieces, removing large

scales and bones, increasing the size of the pieces as the days passed. Prior to each new intake of food uneaten remains were retired.

Figure 7. Veterinary controlling and weighing the birds in Scotland

Ospreys were mainly fed on two fish species. The most frequent were thick-lipped grey mullets, *Chelon labrosus*, directly caught in the estuary by the staff of the project. Eventually, when grey mullets were not available, we fed the ospreys with frozen sea bream, *Boops boops*, purchased in a fish market.

Figure 8. Fishing grey mullets at Urdaibai

Birds were observed directly through the spyglass windows and through the CCTV system to monitor the amount of food eaten and observe their behaviour. No

hierarchical conflicts between individuals were observed and we did not have to manipulate any of them since their behaviour was good.

Table 2. Growth rates from date of collecting in nest to the arrival in Urdaibai, and growth rates during the stay in the hacking tower. The mean daily food intake of each bird in the hacking tower is also shown.

	Growth rate from nest to hacking	Dif (g)	Growth rate during hacking	Dif (g)	Daily food intake (g)
P0	- 0,09	- 230	+ 0,36	+ 200	257,4
P1	- 0,02	- 90	+ 0,11	+ 90	198,18
P2	- 0,06	- 150	+ 0,12	+ 50	137,45
P3	- 0,03	- 150	-	-	244,8
P4	0	0	- 0,10	- 48	271,37
P5	- 0,07	- 200	+ 0,84	+ 468	255,36
P6	+ 0,04	+ 100	+ 0,63	+ 340	280,67
N1	- 0,01	- 70	+ 1,12	+ 510	310,06
N2	0	0	+ 0,15	+ 60	251,92
N3	- 0,03	- 110	+ 0,47	+ 170	226,86
N4	0	0	+ 0,84	+ 314	290,68
N5	+ 0,01	+ 50	+ 1,20	+ 391	280,05

The average amount of food daily eaten per individual was 250.40 g (range=137.47-310.06). Ten of the birds gained weight during the stay in the hacking tower, while one lost weight and other remained with equal weight (Table 2).

Figure 9. Processing of fish and feeding the birds

Daily weight gain in individuals of the Urdaibai project (0.4 ± 0.61, n= 12) was significantly higher (t= 2.65, P= 0.012) than that measured in a similar reintroduction project in Portugal (-0.06 ± 0.36, n= 14)[9]. These differences could be related to the different climatic conditions at the two re-introduction areas that would allow for better growth conditions of the birds in Urdaibai due to the milder oceanic weather in the Basque coast than in Southern Iberia during summer.

Table 3. Period of stay in the hacking tower and period of dependence

	Arrival date	**Release date**	**Days in hacking tower**	**Departure date**	**Days before departing**
P0	10.07.13	31.07.13	22	31.08.13	31
P1	10.07.13	29.07.13	20	02.09.13	35
P2	10.07.13	24.07.13	14	03.09.13	41
P3	10.07.13	03.08.13	24	18.09.13	46
P4	10.07.13	03.08.13	24	14.09.13	42
P5	10.07.13	03.08.13	24	05.09.13	33
P6	10.07.13	07.08.13	27	20.09.13	44
N1	10.07.13	07.08.13	27	15.09.13	39
N2	10.07.13	10.08.13	29	15.09.13	36
N3	10.07.13	06.08.13	26	19.09.13	44
N4	10.07.13	10.08.13	29	19.09.13	40
N5	10.07.13	10.08.13	29	-	-*

* injured

Nestlings remained in the hacking tower between 14 and 29 days (see Table 3). During the stay in the tower (10 July-9 August) the mean daily temperature was 22.1ºC, the mean maximum temperatures was 27.5ºC (range= 21.1-35.3ºC) and the mean minimum temperatures was 17.5ºC (range= 14.0-19.8ºC) (Basque Meteorology Agency, Station of Gautegiz Arteaga)

5.3. **Release and first flight**

A couple of days after noticing that the birds started moving against the front mesh, we opened the hacking tower cages. Before dawn we distributed fish on the feeders and quietly opened the front panels so that the birds could decide themselves when to fly out of the cages. Staff and volunteers discreetly followed from a distance to check the birds leaving hacking cages and the first flights.

Owing to differences in age, birds were released on different days, over a period of 16 days. We conducted seven openings of the hacking tower, since sometimes the birds did not go out that day, or in other cases we had to put back birds that showed difficulties and release them 1-2 days later. The sequence of opening and release of birds is shown in Table 4.

Table 4. Opening days

Date	Cage	Birds	Observations
24 July	1	P0, P1, P2	P0 & P1 did not go out
29 July	1	P0, P1	P0 was frightened by crows and fell down. We put it back in cage 1
31 July	1	P0	
03 August	2	P3, P4, P5	
06 August	3	P6, N1, N2, N3*	P6 & N1 did not go out. N2 fell down after flying perfectly. We put it back in cage 4
07 August	3	P6, N1	
10 August	4	N2, N4, N5	Accident: N5 broke tarsus in nearby tree

* we moved N3 to cage 3

Figure 10. First flights and radiotracking

5.4. **Dependence phase**

The dependence period was 39.2 days (range: 31-46 days, n=11) (Table 3), longer than that observed in North American (32.5 days)[19] and Scottish (30.4 days)[20] natural populations, but similar or shorter than that observed in reintroduction programs of Andalusia (38.3 days)[12], Portugal (44 days)[9] and Italy (48.7 days)[8].

After the first release day, food was provided once a day before dawn, except the last week that fish was given on alternate days.

First fishing attempts were reported the first week after release. However, only one successful fishing event was observed: P4 caught a grey mullet on the fifth day after release.

Figure 11. Monitoring the ospreys during the dependence phase

5.4.1. **Intraspecific interactions**

During all the dependence period, the juveniles showed a semi-gregarious behaviour with frequent visual and vocal contact, and often using the feeders, perches and artificial nests together. We observed up to five individuals on the same feeder and the same artificial platform. Furthermore, during this phase the birds were at the Urdaibai Reserve with at least four migrant ospreys: 2-23 August (1 adult), 11 September (1 juvenile) and 13 September (2 juveniles). No interaction between these "migrant" ospreys and the reintroduction individuals was recorded.

5.4.2. **Interspecific interactions**

We recorded 27 interactions with other bird species: marsh harrier (*Circus aeruginosus*) (11), crow (*Corvus corone*) (7), grey heron (*Ardea cinerea*) (4), black-headed gull (*Larus ridibundus*) (1), yellow-legged gull (*Larus michahellis*) (1), sparrowhawk (*Accipiter nisus*) (1), little egret (*Egretta garzetta*) (1) and peregrine (*Falco peregrinus*) (1). Ospreys chased other birds in 20 cases, while the ospreys were chased in 7 cases (crow, yellow-legged gull and peregrine) (Table 5).

Table 5. Interspecific interactions. +an osprey chases another bird, – a bird chases an osprey

Individual	Date	Species	Result
P0	29.07.13	*Corvus corone*	-
P2	28.07.13	*Corvus corone*	-
P2	29.07.13	*Circus aeruginosus*	-
P2	29.07.13	*Corvus corone*	+
P2	29.07.13	*Circus aeruginosus*	+
P2	29.07.13	*Accipiter nisus*	+
P5	06.08.13	*Circus aeruginosus*	+
P2	05.08.13	*Ardea cinerea*	+
P4	05.08.13	*Ardea cinerea*	+
P4	08.08.13	*Circus aeruginosus*	+
P1	10.08.13	*Circus aeruginosus*	+
P6	17.08.13	*Corvus corone*	+
¿?	17.08.13	*Ardea cinerea*	+
¡?	17.08.13	*Circus aeruginosus*	+
¿?	17.08.13	*Falco peregrinus*	-
¿?	18.08.13	*Ardea cinerea*	+
¿?	18.08.13	*Circus aeruginosus*	+
P1	19.08.13	*Circus aeruginosus*	+
¿?	19.08.13	*Larus ridibundus*	+
P3	22.08.13	*Larus michahellis*	-
N2	24.08.13	*Corvus corone*	-
P5	25.08.13	*Circus aeruginosus*	+
P4	29.08.13	*Circus aeruginosus*	+
N2	03.09.13	*Egretta garzetta*	+
¿?	07.09.13	*Corvus corone*	+
N1	07.09.13	*Circus aeruginosus*	+
¡?	10.09.13	*Corvus corone*	-

5.4.3. **Disturbances**

Human presence caused flight reaction of ospreys on six occasions: helicopter flight at low altitude (3 times) and canoes (3 times).

5.4.4. **Veterinary care**

All birds were clinically examined on arrival. During the stay in the hacking tower the juveniles showed no signs of illness, so it was not necessary for any handling.

The N5 individual had an accident on its first flight and broke a tibia after it got suspended by one leg in a fork of an eucalyptus tree. We began the recovery of this bird in the hacking tower but finally we sent it to the Raptor Recovery Centre of *Brinzal* (Madrid). Three months later it was released again in Urdaibai, but it was not able to survive.

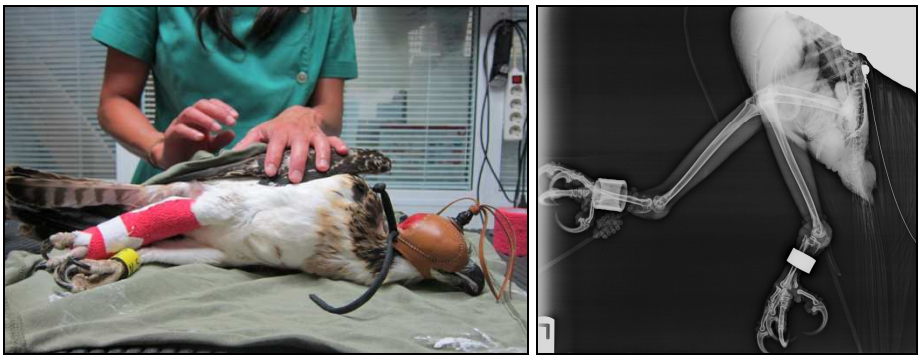


Figure 12. Veterinary care of N5 after the accident

6. Telemetry

Nine birds were equipped with VHF radio-tags (*Biotrack* PIP AG393), attached to a pair of back feathers. The birds were tagged during the night, two days before the release. These transmitters were used to detect daily the individuals and to know the departure date (Table 3). They were also useful to locate birds in emergency situation. For example, thanks to the transmitter VHF we rescued one bird that fell down during its first flight after being frightened by a flock of crows.

Figure 13. Installing a transmitter

Three individuals (P6, N1 and N2) were fitted with a satellite transmitter (*Microwave* 30 g Argos/GPS Solar PTT), attached to the back by a Teflon harness that was installed also overnight in the hacking tower. The VHF device of another two individuals (P3 and P4) was replaced with a satellite transmitter about a month after its release. These two birds were captured with nooses in the feeding platforms. These two birds increased their weight at a rate +0.16 and +0.19 g per day (data corrected by the biomass of each individual) from transmitter tagging in the hacking tower to the capture (30 days).

The information provided by the five satellite transmitters was used to determine the home range, the day of departure, the migration route and the wintering area.

During the dependence phase the satellite-tracked birds used a maximum area of 6.89 km^2. However, the most frequent used area was only about 0.2 km^2 (Figure 14). Table 6 shows the home ranges of the satellite-tracked birds.

Table 6. Days of transmission, maximum home range and maximum distance from the hacking tower of the satellite tracked birds during the dependence phase

	Transmission days	Maximum home range (km^2)	Maximum distance (km)
N1	39	6.89	3.38
N2	36	1.98	2.19
P3	13	0.15	0.48
P4	12	0.10	0.54
P6	44	1.63	2.15

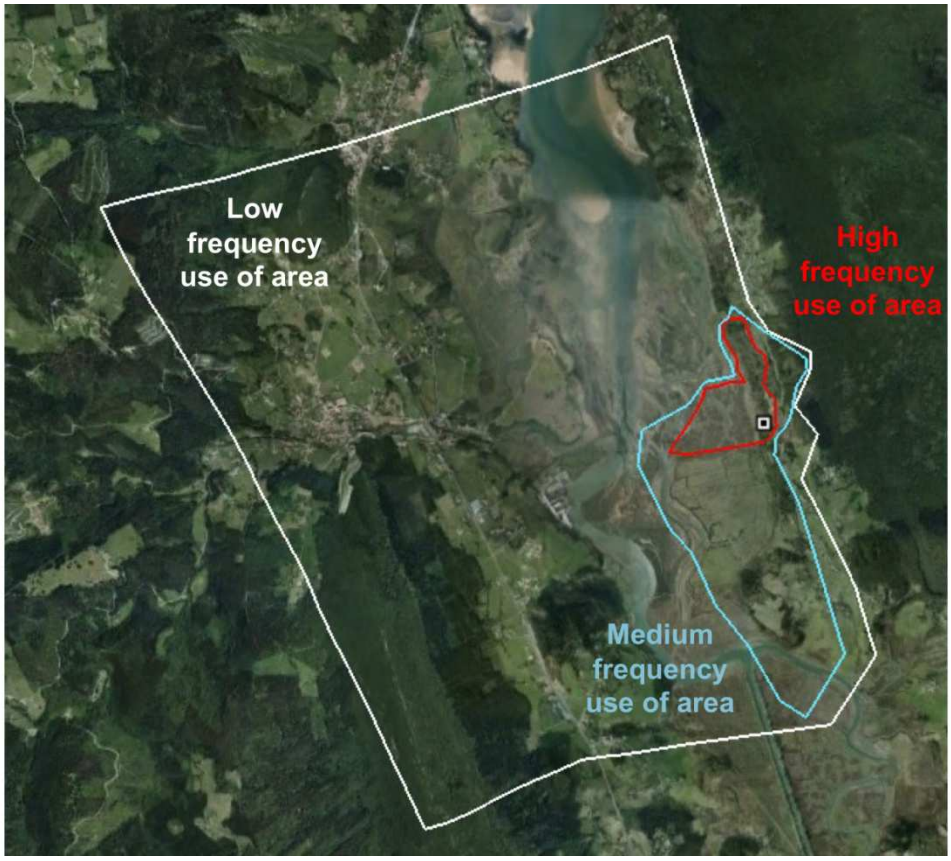


Figure 14. Home range of the satellite tracked birds (n=5). The colour of the lines shows the intensity of the use of the area (White: low frequency, Blue: Medium frequency, Red: high frequency)

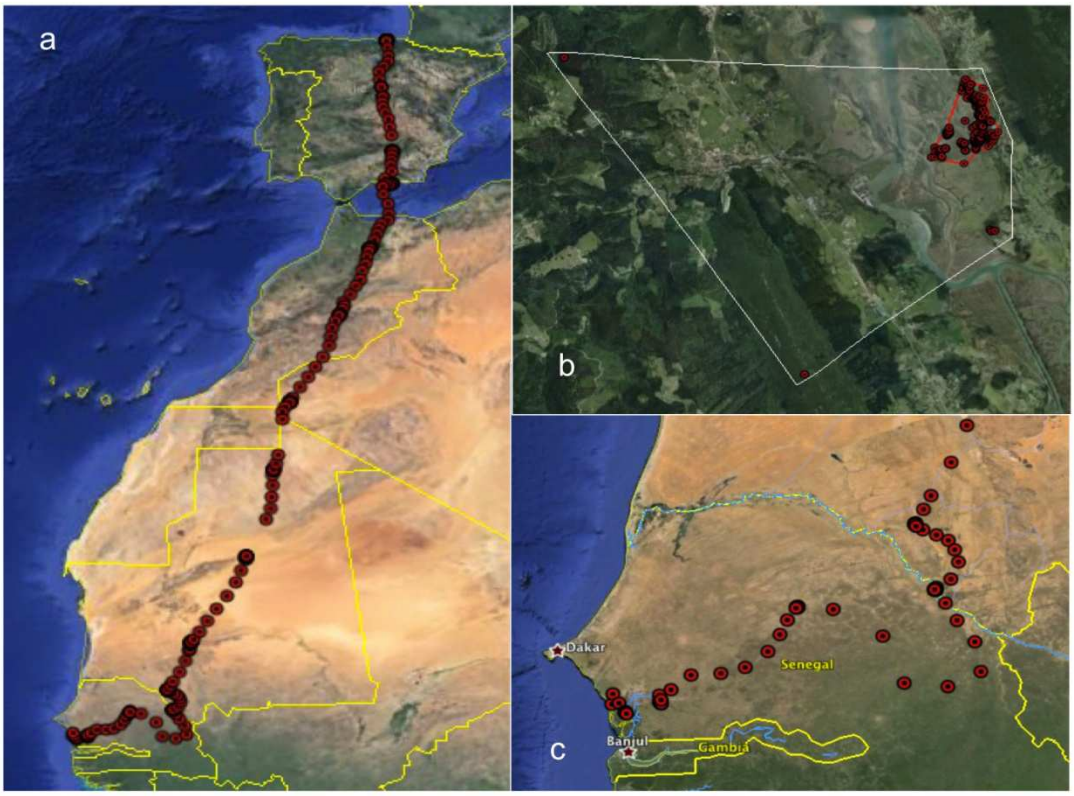
URDAIBAI

PVC ring **N1** (Yellow) - Transmitter **130499** - Sex **Female**

During the dependence phase, it moved almost exclusively the surroundings of the hacking tower. Most nights roosted on power line poles (23 nights) less than 500 m from the tower, but occasionally used the perches (5 nights) and the artificial nest (2 nights) located in front of the tower.

Release day: 7 August
Transmitter installation: 4 August
Departure: 15 September from 11:00
Crossing to Africa: 18 September, 9:00
Arrival at Senegal: 29 September.
Wintering quarters: coast between Dakar and the Sine-Saloum estuary (Senegal)
Last position: 10.01.14 Point Serena (Senegal) (14.276463ºN -16.907963ºE)

Migration route (a), Home range (b) and wintering quarter (c) of N1



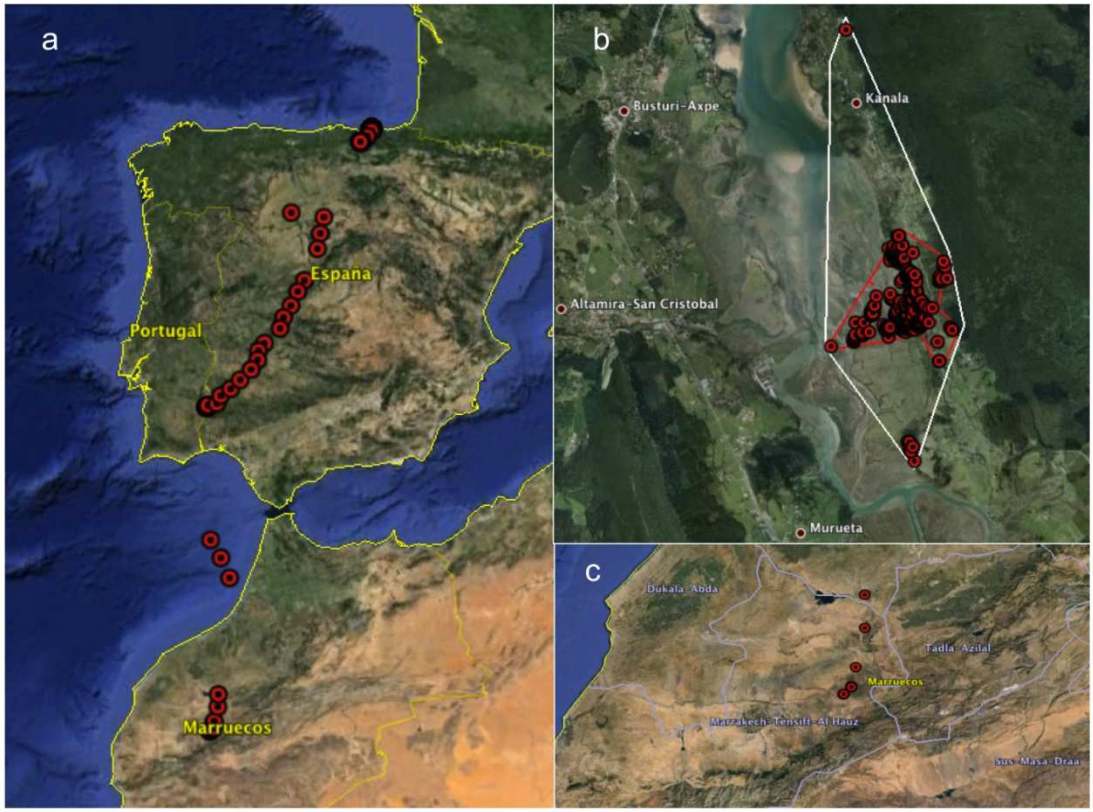
MONTORRE

PVC ring **P6** (Yellow) - Transmitter **130530** - Sex **Female**

During the dependence phase, it moved almost exclusively in the area near the hacking tower. Most nights roosted (31 nights) in the wood closed to the hacking tower, although eventually used the perches located in front of the tower (7 nights).

Release day: 7 August
Transmitter installation: 4 August
Departure: 20 September from 11:00.
Crossing to Africa: 25 September at 13:00
Last location: 27/09/2013 at 9:00 (31.73333ºN, 7.50450ºE) Morocco (Transmitter Failure?)

Migratory route (a), home range (b) and last locations (c) of P6



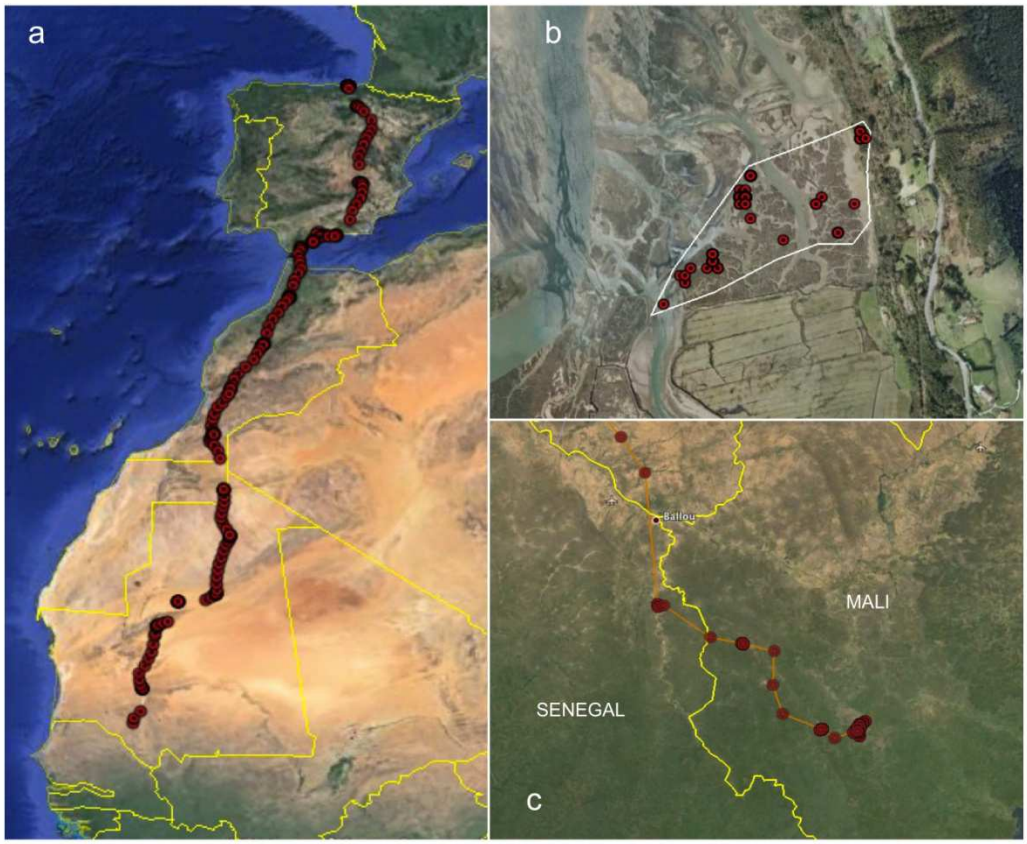
BRINZAL

PVC ring **P4** (Yellow) **-** Transmitter **130531 -** Sex **Male**

During the dependence phase, it used mainly the surrounding marsh near the hacking tower. It roosted on the perches and the artificial nest in the marsh (10 nights).

Release day: 3 August
Transmitter installation: 3 September
Departure: 15 September at 10:00
Crossing to Africa: 19 September at 09:00
Wintering quarters: upper basin of the Senegal River, Bafing River (Mali)
Last location: 19/11/2013 at 17:00 (31.73333ºN, 7.50450ºE) Mali

Migratory route (a), home range (b) and wintering area (c) of P4



ARTIA

PVC ring **P3** (Yellow) **-** Transmitter **130532** - Sex **Female**

During the dependence phase, it used exclusively the surroundings of the hacking tower, and roosted on poles of an electric line (7 nights) and the artificial nest of the marsh (3 nights). On 18 September it made a long exploratory flight and was electrocuted at 17:00 when perching on a pole outside the Urdaibai Reserve. It weighed 2080 g when it died, so it had increased its weight at a rate of + 0.17 g per day since the transmitter tagging (14 days).

Release day: 3 August
Transmitter installation: 5 September
Departure: 18 September

Home range of P3

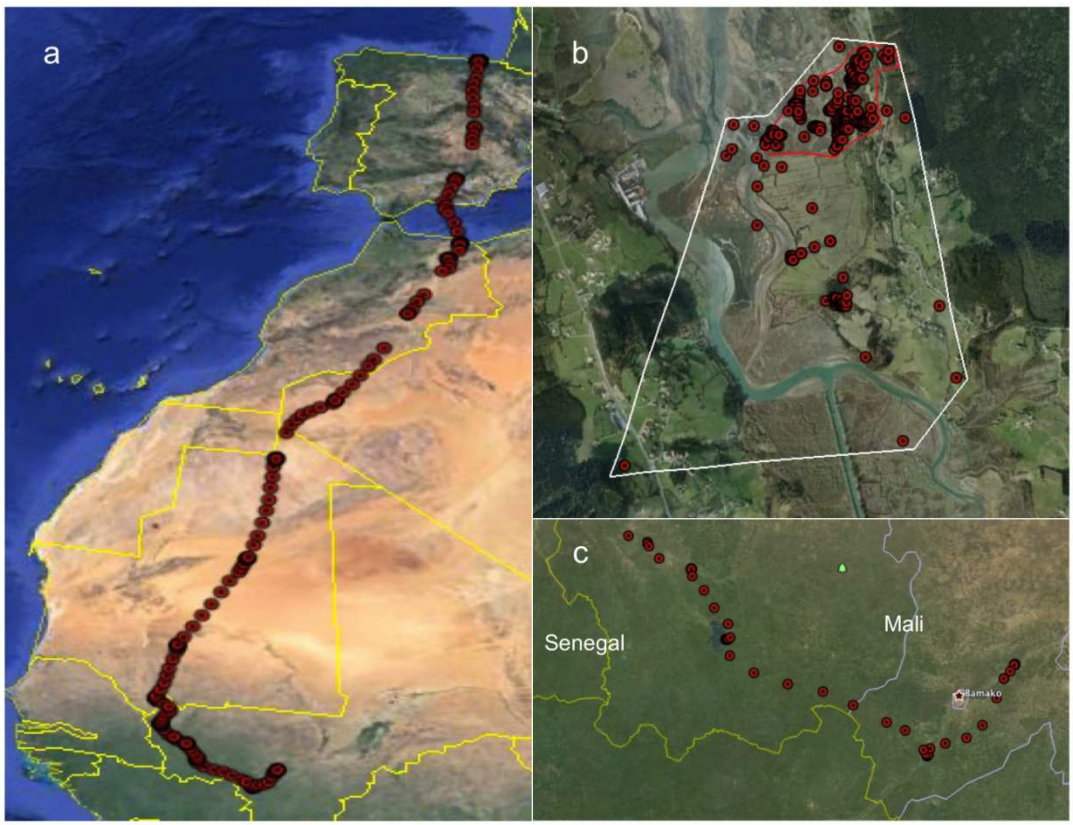
URRETXINDORRA

PVC ring **N2** (Yellow) -Transmitter **130533** - Sex **Male**

During the dependence phase it occupied a wider area than the other four individuals, although locations were not greater than 2 km from the hacking tower. Most of the nights (31) it roosted in a pine grove 1 km from the hacking tower and also used the feeding platforms (6 nights) and the artificial nest (8 nights).

Release day: 10 August
Transmitter installing: 4 August
Departure: 15 September at 11:00
Crossing to Africa: 17 September at 16:00
Winter quarter: Inland delta of the Niger River (Mali)
Last position: 19/10/2013 21:00 (13.562409ºN, 6.176812ºE) Mali

Migratory route (a), home range (b) and wintering quarter (c) of N2



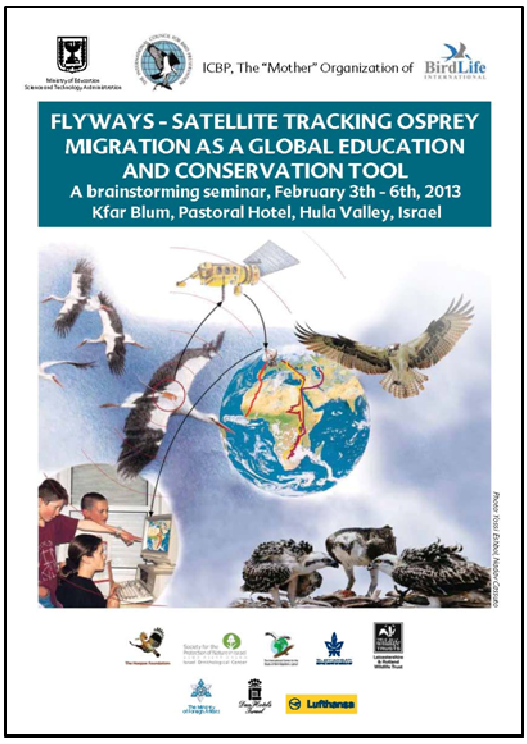
7. Dissemination

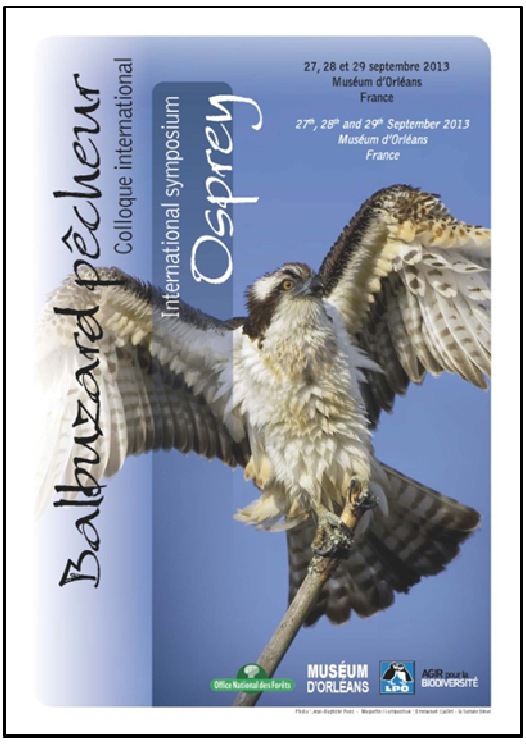
7.1 International talks

October 2012.
International workshop on proper design of avian reintroduction projects. International University of Andalusia, Baeza (Jaén, España). Presentation: *Reintroduction of non-threatened species to promote conservation in protected areas: the case of the Urdaibai Biosphere Reserve*.

February 2013.
Flyways-satellite Tracking osprey migration as a global education and conservation tool: a brainstorming seminar. Society for the Protection of Nature in Israel (Hulla Valley, Israel). Presentation: *The birds as tools for learning nature conservation and also as subjects at schools: the case of Urdaibai.*

September 2013
Osprey International Symposium. Orleans Natural History Museum (Orleans, Francia). Poster: *First year of osprey reintroduction in the Basque Country (Northern Spain)*.





7.2. Local talks

February 2013
Project presentation to the staff of the Urdaibai Biosphere Reserve (Gernika, Biscay).

March 2013
Project presentation to the staff of the city of Gautegiz-Arteaga. Urdaibai Bird Center (Gautegiz Arteaga, Biscay).

March 2013
Project presentation to the Mountain Farming Association URREMENDI and the local Tourism Office. Oficina Comarcal Agraria (Gernika, Biscay).

April 2013
Public project presentation. *Ornithological Seminars. Aranzadi Society of* Sciences. Urdaibai Bird Center (Gautegiz Arteaga, Biscay).

May 2013
Project presentation to the Ornithological Association LANIUS. (Bilbao, Biscay).

September 2013
Project presentation to the schools that take part in the programme *Linking schools and communities*. Community Hall of Kanala (Gautegiz Arteaga, Biscay).

October 2013
Project presentation to the local community. Community Hall of Kanala (Gautegiz Arteaga, Biscay).

November 2013.
Practical course of Vertebrate Zoology. University of the Basque Country. Urdaibai Bird Center (Gautegiz Arteaga, Biscay).

November 2013
Project presentation. Symposium on Tourism and Environment. City of El Oso (Ávila)

December 2013
Presentation and first results of the project. *Ornithological Seminars. Aranzadi Society of* Sciences. ATARIA, Centro de Estudios Ambientales. City of Vitoria-Gasteiz.

7.2. Project news in the web and press

http://www.wildlifeextra.com/go/news/osprey-spain.html#cr

http://www.heraldscotland.com/news/home-news/scottish-ospreys-released-on-spanish-coast.21867884

http://www.snh.gov.uk/news-and-events/press-releases/press-release-details/?id=921

http://www.scotsman.com/news/environment/scots-ospreys-introduced-to-northern-spain-1-3044618

http://furfeathersandfriends.blogspot.com.es/2013/10/scottish-ospreys-in-spain.html

http://www.snh.org.uk/pdfs/SNHMagazine/SNHMagazine_AutumnWinter2013Issue18.pdf

http://www.eitb.com/es/videos/detalle/1726586/video-el-aguila-pescadora-esta-siendo-reintroducida-urdaibai/

http://www.deia.com/2013/10/09/bizkaia/costa/una-de-las-aguilas-pescadoras-aparece-electrocutada-en-el-monte-oiz

http://www.bizkaia.net/home2/Bizkaimedia/Contenido_Noticia.asp?Not_Codigo=12024&idioma=CA&bnetmobile=0&dpto_biz

http://www.birdingeuskadi.com/noticia.aspx?id=rQ2qQHYXYbYJd+FYXx54CA==

http://www.europapress.es/euskadi/noticia-diputacion-bizkaia-impulsa-proyecto-recuperar-aguila-pescadora-urdaibai-201303141

http://zaindezagun.blogspot.com.es/2013/04/el-aguila-pescadora-vuelve-unir.html

http://busturialdea.hitza.info/2013/09/26/urdaibaiko-arrano-arrantzaleen-migrazioa-satelite-bidez-jarraitzeko-aukera-dago/

http://busturialdea.hitza.info/2013/03/27/arrano-arrantzalea-berreskuratzeko-proiektua-jarri-dute-martxan-urdaibain/

http://busturialdea.hitza.info/2013/07/23/bost-txita-arrano-arrantzale-ekarri-dituzte-eskoziatik-espeziea-berreskuratzeko/

http://www.europapress.es/euskera/noticia-urdaibaiko-arrano-arrantzaleen-bidaiak-jarraitu-ahal-izango-dira-urdaibai-bird-

http://m.deia.com/2013/04/28/bizkaia/costa/el-aguila-pescadora-vuelve-a-unir-a-urdaibai-con-escocia

8. **Acknowledgements**

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- Pirkanmma Centre for Environment, Finnish Government
- Finnish Osprey Foundation, Finland
- Migres Foundation, Spain
- Heathrow Animal Reception Centre, City of London, UK
- Valvospain Group
- Ministry of Agriculture, Food and Environment, Government of Spain
- Ministry of Economy and Competitiveness, Government of Spain
- Biodiversity Agency, Basque Government, Spain
- Department of Environment, County Council of Biscay, Spain
- Department of Agriculture, County Council of Biscay, Spain
- Board of the Urdaibai Biosphere Reserve, Basque Government, Spain
- City of Gautegiz Arteaga, Spain

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