BIRDING/OSPREY TERMS	
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ALLOPARENTING	Alloparenting, or the investment in young by individuals other than the biological parents, occurs among a wide array of insects, birds, and mammals
ALLOPREENING	Allopreening or allogrooming, has both hygienic and signal functions in many birds and strengthens pair bonding
ANTHROPOMORPHISM	The attribution of human characteristics or behaviour to a Bird or Animal.
ASYNCHRONOUS HATCHING	Pattern of hatching in which the eggs of a single clutch hatch over a period of several days, resulting in a brood of young of different ages. This pattern occurs when incubation begins at the time the first egg is laid.
BANDS	See Rings below. Bands is a term more frequently used in the United States
BETA-OXIDATION	is a metabolic process involving multiple steps by which fatty acid molecules are broken down to produce energy. (See Hyperphagia Below)
BROOD PATCH	A bare patch of skin that most female birds gain during the nesting season for thermoregulation purpose
BROODING	Sitting on hatched young, or sheltering them under the wings, primarily to keep them warm, but also to protect them from sun, rain, or predators.
BPD BIPARIETAL DIAMETER	Female Ospreys have broader heads than their Male counterparts, thus this can be used to aid gender identification.
CARRYING CAPACITY,	SEE GREGORIOUS TOONEN'S EXPLANATION AT END OF DOCUMENT
CLOACA	A multi-purpose opening terminating at the vent at the posterior of a bird: birds expel waste from it; most birds

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	mate by joining cloaca (a "cloacal kiss"); and females lay eggs from it
CROP	It is an enlargement of the oesophagus and serves as a storage place for food.
DENSITY DEPENDENCE	SEE GREGORIOUS TOONEN'S EXPLANATION AT END OF DOCUMENT
DIURNAL	Active during daylight hours
EYESTRIPE	A visible stripe on the feathers of a bird's head, often darker than the surrounding feathers, running through the eye region
FEAKING	The act of rubbing the beak against a surface for cleaning or maintaining beak shape, often done after eating.
FLEDGE	The stage in a young bird's life when the feathers and wing muscles are sufficiently developed for flight
GULAR FLUTTERING	Gular fluttering is used as a means to thermoregulate. In gular fluttering, bird will often open the beak and fluttering the upper throat muscles
HELICOPTERING	Just prior to the fledging stage, young birds whilst flapping their wings to strengthen muscle will ascend vertically several feet above the nest, this action is termed Helicoptering.
HYPERPHAGIA	To support migratory endurance flight, birds accumulate large amounts of fat by hyperphagia (fueling). (See Beta-Oxidation above)
INCUBATI0N INCUBATING	Incubation is the process of keeping eggs warm until the young hatch. In ospreys the incubation period is around 39 days for the First egg and 36 thereafter.
KLEPTOPARASITISM	is a form of feeding in which one chick deliberately takes food from another

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MANTLE COY MANTLING DEFENCE MANTLING	Mantling is a behaviour many birds of prey will assume after securing a kill. In this pose, the wings are spread over the prey item, exposing the bird's mantle , which gives the action its name. Coy Mantling is a term used to describe some courtship/pair Bonding behaviours which mimics Mantling, however in a more inclusive manner. A more aggressive form of Mantling can be seen when the birds are defending the nest from intruders.
MIGRATION	Migration is the regular seasonal movement, often north and south, along a flyway, between breeding and wintering grounds
MOULT	The periodic replacement of feathers by shedding old feathers while producing new ones.
MULTIARTICULAR DIGIT FLEXOR MUSCLE-TENDONS	Birds have specialized flexor tendons in their legs that, when a bird squats, automatically tighten and lock their toes around a perch. which allows them to grip a branch without deliberate effort, even while sleeping. This is also used in prey prehension, Allowing Birds like Raptors to grip prey without conscious effort
NATAL NEST	Where the Bird was hatched/fledged. In non-translocated birds it refers to the nest within which they hatched and fledged. Concerning Translocated birds it is the nest from which the fledged.
NECKLACE	Darker feathers around the chest and crop area on Female ospreys resembling a necklace and aiding in gender identification.
NEST FIDELITY	Loyalty shown by birds to nests they previously occupied;
NICTITATING MEMBRANE	A transparent or translucent third eyelid that can be drawn across the eye to protect and moisten it while maintaining vision

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OPERCULUM	Technical Term for Gill cover in fish, usually discarded before swallowing by Ospreys.
PHILOPATRY	The habit of a bird returning to the area it first bred. Much more evident in males who tend to nest within 40 km, females are less likely to be constrained as they are looking for a male with a nest. See Statement Below
PREENING	Feathers require maintenance and birds preen or groom them daily,
PROTOPORPHYRIN	Marking on Osprey Eggs is a result of protoporphyrin produces reds and browns as a ground colour or as spotting,
REVERSED SEXUAL SIZE DIMORPHISM	The term 'reversed sexual size dimorphism' (RSD) refers to the phenomenon in which the females of a species are larger than the males. Reversed sexual size dimorphism is exhibited by most raptor species in the phylogenetically distant orders Accipitriformes (including Cathartidae), Falconiformes and Strigiformes. Possible Reason:- Nest defence hypothesis is the most likely to explain the phenomenon in all birds of prey that show RSD: if the female predominates in actively defending the eggs and young against predators, then she is the heavier sex, and her relatively greater body mass is adaptive. That is, heavier females are favoured (independently of males) by natural selection.
RINGS	Young birds are fitted with two Rings One is a metal BTO (British Trust for Ornithology) This metal ring is numbered and includes a British address so that finders can send finding details to the BTO as part of the national bird ringing scheme. The second Ring is known as a Darvic Ring and is made of coloured plastic, the colour ring is unique and allows individual birds to be identified in the field using a telescope or telephoto camera. Over the years several colour combinations have been used, currently in the uk Blue bands with white

[Report a colour-ringed Osprey - Roy Dennis Wildlife Foundation]
[UK osprey Information]

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	alphanumeric figures are being used, this Darvic Ring is placed on the left leg in Scotland and on the right in England and Wales.
SIBLICIDE	Is the killing of an infant individual by one of its siblings.
SKYDANCING	Aerial Display put on by the male to attract or strengthen the bond with a female.
THANATOSIS ALSO KNOWN AS PANCAKING	immobility, also known as the act of feigning death, a reaction which can be seen in young chicks following alarm calling from the parents.
THERMOREGULATION	The active ability of an organism to modulate its internal body temperature.
UNIHEMISPHERIC SLOW-WAVE SLEEP	Sleep with one eye open, Birds have the ability to allow one side of their Brain to sleep whilst the other side remains awake.
UNIPEDAL STANCE STANDING ON ONE LEG,	There are four reasons why: reduce heat loss, minimise muscle fatigue, and rest better. The fourth being in raptors where they hold prey with one foot whilst standing on the other
UROPYGIAL GLAND PREENING GLAND	Found near the base of the tail feathers. The oil secreted by the uropygial gland performs many functions in the bird, including waterproofing and keeping the skin, feathers and bill supple.
WINTERING GROUNDS	Reference to the autumn migration destination and where the birds spend the winter months it is also the home for first time migrators for 18 months until they return in the late spring of their second year. Wintering grounds range from Spain and Portugal as far south as Gambia and Senegal.
ZYGODACTYL	Ospreys are unusual among raptors in possessing a reversible outer toe that allows them to grasp with two toes in front and two behind

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PHILOPATRY

Gregorius Joris Toonen

From his Thesis; Where he explained the concepts of philopatry and nest site fidelity in Ospreys.

Male ospreys are highly philopatric; they are more likely to nest close to their natal nesting sites.
Males show a clear tendency to nest within 50 km from their natal sites, whereas females tend to nest further away (Dennis, 2008; Poole, 1989; Väli et al., 2021). Poole (1989) explains the difference between male and female philopatry by familiarity with a locale, which would help males to find nesting sites, the critical asset for attracting a mate. Females might be expected to disperse more widely, as their sole imperative is to find a male with a nest.
Closely related to philopatry is nest site fidelity: the drive to return to the spot where they first chose to nest.
Because the osprey is a long-lived species which uses the same nest for many consecutive years, returning offspring are likely to find the natal nest still occupied by the parents when it returns to breed for the first time. Usually, such a prospecting newcomer will find a suitable place to build its nest at a site nearby that satisfies its needs in a similar habitat, or alternatively, find an existing nest with a vacant slot (Österlöf, 1977).
Gregarious Toonen

CARRYING CAPACITY/DENSITY DEPENDENCE

I can imagine that at least in parts of Scotland the carrying capacity (saturation point) is reached, or about to be reached, after which the natural mechanism of density dependence kicks in.
A bit simplified, carrying capacity is the maximum population of a species which can be sustained in a given environment or area based on the locally available resources. These resources are not only food and water, but also such things as habitat, and suitable nesting sites in the case of ospreys.
When one or more of these resources become scarce a mechanism called density dependence kicks in, or rather density dependent restriction, which means that population growth is curtailed by crowding, predators and competition for resources. In the case of ospreys above all competition.

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Even though I don't know the exact situation in Scotland, I don't think that scarcity of food as such is a problem, given all the ponds, rivers, estuaries and lochs everywhere. So I don't think competition for food is much of an issue.
But, knowing that large swaths of Scotland have been deforested, and that where there is forest the population of deer tends to eat up nearly all saplings, there is little forest regeneration. Which again leads to fewer trees suitable for nesting. As a side note, in his book, "Ospreys, a natural and unnatural history", Allan Poole writes that even in a completely natural mature forest less than one in a thousand trees will be suitable to meet the ospreys' demands for a nesting site.
So I think it's above all the lack of suitable nesting sites which is the limiting carrying capacity factor in Scotland, in turn causing the density dependence mechanism to kick in.
This density dependence translates into breeding at higher age, and more 'floaters' (adult ospreys in breeding age without a nest and/or mate) about waiting to fill an empty slot on a nest when one of the breeding residents fails to return, or just trying to take over a nest.
When a floater tries to take over a nest all kinds of things can happen. Early during breeding season eggs can be kicked out by the intruder, resulting in a failed nest. Or the resident ospreys are defending their nest, leaving eggs or small chicks unprotected which then are prone to cooling and/or predation causing the loss of eggs/chicks. Later in the breeding season these intruding floaters may cause the resident ospreys, above all the males, to use a much larger part of their time budgets to chase away the intruders, which goes at the expense of foraging, and thus the amount of fish brought to the nest, often resulting in starvation of one or more of the chicks.
In cases where floaters patiently wait for an empty slot on an existing nest it often means that they breed at a higher age than in non-saturated populations, which again results in lower output of offspring during its lifespan.
All this causes a considerably lower output of fledglings, and down the line fewer returning ospreys, until some sort of balance is reached.
Taking away a few osplets for translocation from such a saturated, density dependent population wouldn't have a negative impact, as it means fewer returning floaters who can cause disturbances. When there are fewer floaters the population will respond by getting more chicks to fledging again.
Very long story short: as far as I see it, if one wants to increase the number of breeding ospreys in (parts of) Scotland, the solution would be to provide more nesting opportunities in otherwise suitable habitat which currently has no or just a few nesting ospreys. I.e. erect nesting platforms in the short term, and in the long run to allow the forests to regenerate, for example by limiting the unnatural high number of deer and grazing sheep.
PS, adverse weather during migration causing fewer adults to return and breed, or adverse weather during the early stages after hatching causing chicks to die, will only have a short term effect on a population (unless these things would happen several years in a row, which normally isn't the case).

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