



The Ecological Roles of Eagles.

Increasing awareness of the ecological and conservation roles of the Golden and White-tailed Eagle.



Argyfwng Natur Cymru -

Wales' Nature Crisis

Wales is facing a climate and nature crisis. One in six assessed species are at risk of extinction, and none of our natural systems – from coasts to mountains – are resilient enough to sustain healthy biodiversity and climate.

The crisis in Wales requires an emergency response. If we don't succeed, the damage will be irreparable. It will fundamentally change the Wales we know. It will change our environment; our economy; and the cultural heritage we leave for our children and grandchildren.

The 2019 State of Nature Report provides us with the latest detailed scientific analysis of what is driving this crisis in Wales and the wider UK – from unsustainable agricultural management and climate change through to invasive non-native species and hydrological change.

In response to these challenges we identify the ecosystem functions of two native-lost eagle species, which if restored, could be taken as part of rapid emergency responses in Wales. **This report focuses on increasing awareness of the ecological and conservation roles of the Golden and White-tailed Eagle.**

This report focuses on the following: -

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- 2) Cwrdd â'r Eryrod - Meet our Eagles
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Beth yw Eryr? -

What is an Eagle?



An eagle, in lay terms, is the common name for many large birds of prey which are active during the day. They are characterised as large, heavy-beaked, big-footed birds of prey belonging to the family *Accipitridae*. There are 60 species of eagles across the globe and every continent, except Antarctica, is home to at least one eagle species. Eagles are important to their landscapes, as they provide valuable ecosystem functions to a wide-range of habitats, from grasslands, moorlands and mountains to wetlands, woodlands and forests.

Eagles sit on top of the food chain and assist in important roles to directly balance and indirectly shape the health of their ecosystems. This role crowns eagles as **sentinel and indicator species** of biodiversity and habitat health. Eagles also pervade global culture and heritage, from the start of recorded history eagles have appeared as icons and emblems, embodying such virtues as freedom and nobility. This iconic and charismatic status enables these birds to act as **conservation champions** to highlight the importance of their habitats and the biodiversity that live beside them.

Many eagle populations are in decline or extinct across their native ranges due to habitat loss, land use, climate change, pollution and human persecution. Current conservation for eagles promote the protection of regular breeding, roosting and hunting grounds. Eagles require a lot of space and are often referred to as **umbrella species**. The protection of large expanses of eagle habitat also provide safe havens and secure spaces for a wide-range of biodiversity.



Cwrdd â'r Eryrod -

Meet our Eagles ...

There are two species of eagles native to Wales; The Golden Eagle and White-tailed Eagle. Both species have been absent from the Welsh landscape for over 150 years and were hunted to extinction by humans. This report highlights the ecological and conservation roles of both eagles and how they can benefit Wales.

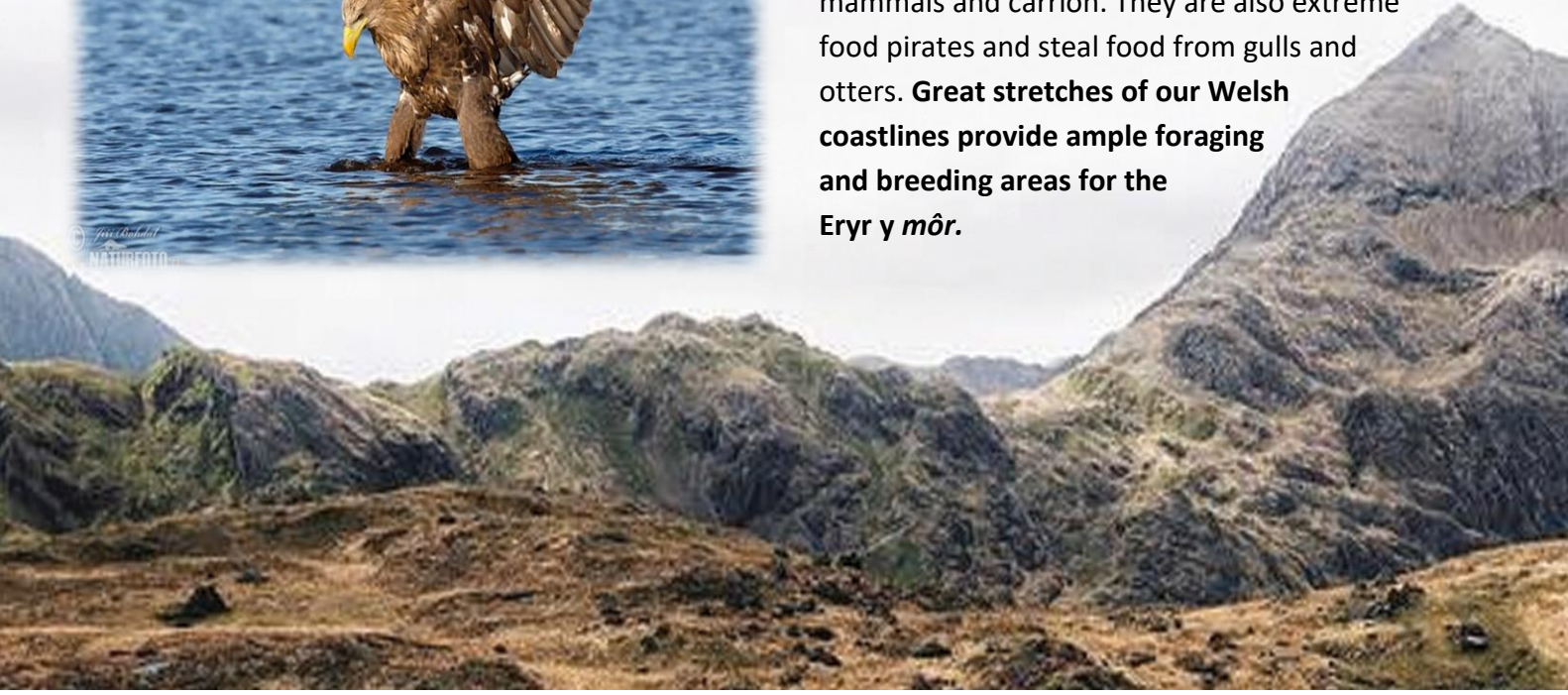
ERYR EURAID

The Golden Eagle (*Aquila chrysaetos*) is a bird of open mountains, grasslands, moors, hills and deep valleys. They mostly require crags and cliffs to build their nests, making them a bird that also thrives in coastal areas. They favour habitats where medium-sized, ground-dwelling prey are abundant (e.g. birds, rabbits, hares, etc.). They also eat carrion, reptiles, birds and smaller prey such as large insects. **There are great expanses of suitable habitat for the Eyr Euraid in Wales!**



ERYR Y MÔR

The White-tailed Eagle (*Haliaeetus albicilla*) is a bird of large waterbodies (e.g. coastlines, estuaries, lakes). They build nests in mature trees or coastal crags. These birds prefer fish and water birds most of the year, but alter their winter diet to small mammals and carrion. They are also extreme food pirates and steal food from gulls and otters. **Great stretches of our Welsh coastlines provide ample foraging and breeding areas for the Eyr y môr.**



Rhaeadru Troffig -

Trophic Cascades

Eagles are important species that play a unique and crucial role in the way an ecosystem functions. Eagles regulate and support their habitat by providing ecosystem services that contribute to a high functioning and ecologically resilient ecosystem. The absence of native eagles can have regional consequences on the health and quality of associated habitats and biodiversity.

PREDATOR – PREY RELATIONSHIPS

The Golden and White-tailed Eagle's main ecological role is to serve to keep prey numbers in check. Keeping biodiversity balanced is a crucial role that improves biodiversity and habitat health.

Without a predator, like an eagle, ecosystems can quickly get out of balance. Prey populations expand and over-utilize more food and resources. As prey population increase habitats reach their carrying capacity and lack of food, resources and disease overwhelm them (e.g. Myxomatosis in Rabbits).

Eagles are prey generalist and respond to seasonal cycles of prey, taking advantage of the most abundant populations keeping prey in balance. Eagles assist prey populations by weeding out the slow, weak, injured, disease and dying prey – strengthening the general health and gene pools of native biodiversity. Eagles provide this balancing service faster on the wing than other predators.

The mere presence of an eagle also alters the behavior of their prey. A healthy population of eagles keep prey moving around looking for cover and generally trying not to get eaten due to fear. In turn, creating new spaces for biodiversity, better quality soil, flora and fauna and sustaining healthier habitats – leading to higher species richness in lower trophic levels of the food chain.

Eagles will return key ecosystem functions as a result of top-down control over the food chain. Directly and indirectly increasing biodiversity and habitat health.



Gweithred Gydbwyso -

A Balancing Act

Eagles also play an important role in their habitats by regulating, not only their prey species, but the population numbers of smaller meso-predators. This is commonly termed intraguild competition. Both the Golden and White-tailed Eagle provide regulatory and supporting roles to all levels of the food chain.

MESO-PREDATOR RELEASE EFFECT

Smaller ecologically similar birds of prey, such as the Red Kite and Common Buzzard, are typically outcompeted by eagles for food or other resources (e.g. foraging and nest sites). Eagles are the most dominant species in their habitats, thus, like other lower-trophic level species, smaller meso-predators often avoid territories claimed by eagles or alter their hunting and foraging patterns to reduce the chances of an encounter.

Both the Golden and White-tailed Eagle suppress smaller aerial meso-predators either by treating them as prey or instilling fear, which motivates changes in behaviour and habitat use that alter the distribution and abundance.

Without eagles, smaller avian meso-predators are able to occupy greater expanses of nesting and foraging habitats. Leading to greater population numbers and increased pressure on smaller prey (e.g. birds, small mammals and insects).



COMPETITION BETWEEN A BUZZARD AND RED KITE

Increasing population of smaller birds of prey, mostly generalist species, causes many of their prey species to suffer dramatic declines and further disruption to an un-balanced food chain.

A healthy population of eagles do not only support and regulate healthier biodiversity and Habitats. They also regulate biodiversity and increase resource availability and habitat Complexity – supporting a more complex predator community.



Glanhawyr amgylchedd -

Environmental Cleaners

Both eagles are facultative scavengers and rely on carrion. Carcasses are a high-quality energy resource and requires little energy expenditure in comparison to hunting live prey. White-tailed Eagles scavenge through all season, while Golden Eagles rely heavily on carrion in the Winter. Both eagles support their habitats by removing decaying animal matter and maintaining a clean habitat. Critical ecosystem services for humans and other biodiversity.

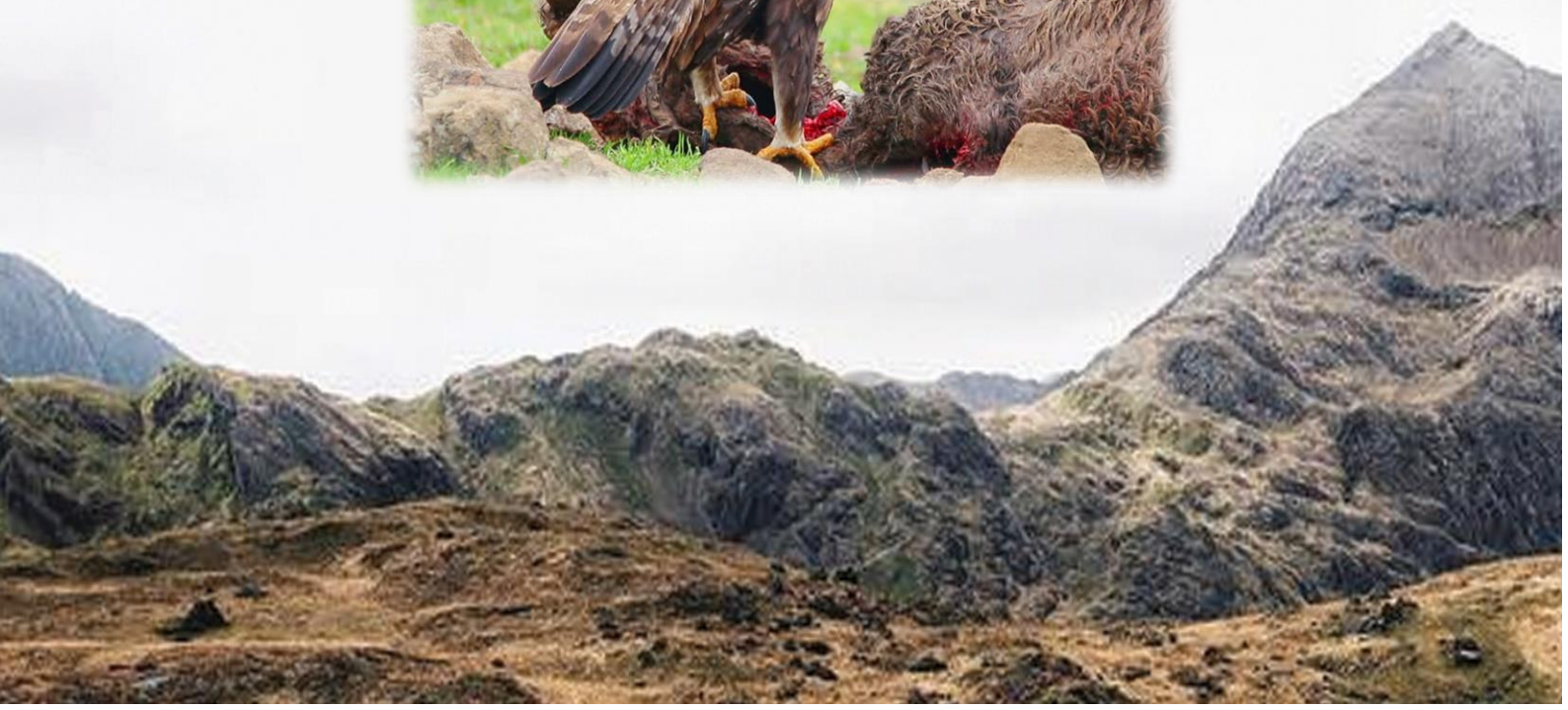
SCAVENGERS

Scavengers play an important role in the food web. They help break down organic material and accelerating nutrient cycling, all in all, limiting the spread of environmental disease. Both eagles, as scavengers also transfer significant amounts of energy between trophic levels for a more balanced food web.

By restoring eagles to upland and coastal habitats these birds can play an important role in the breakdown and removal of natural carcasses such as; road kill, culled animals and deceased livestock.

Their presence at carcasses reduce the activity of feral terrestrial scavengers (e.g. foxes, rats etc.) and prevents the spread of disease such as blowfly strike and leptospirosis, which are fatal to humans and livestock.

GOLDEN EAGLE AT A CARCASS



Cysylltwyr Troffig ac Adnodda -

Trophic and Resource linkers

Eagles are mobile links that are crucial for maintaining ecosystem function and resilience. Both Golden and White-tailed Eagle's ecological functions encompass both trophic and resource links. These functions support energy transfer within food chains, cycle nutrients and links that influence plant, invertebrate and vertebrate prey populations.

TROPHIC PROCESS LINKERS

Eagles are process linkers that connect and provide essential services to multiple habitats. One example, is how eagles speed the decomposition of disease-carrying carcasses across multiple species and habitats.

A second example, is how eagles provide and support natural pest control to reduce agricultural pests (e.g. fox, corvids, gulls). An ecosystem service that is replaced by pesticides, leading to ecosystem damage and health impairments.



GOLDEN EAGLE CLIFF NEST

RESOURCE LINKERS

Eagles transport nutrients and energy resources from areas of high productivity to areas of low productivity – particularly between aquatic and terrestrial.

One example, is how White-tailed Eagle transfer nutrients from aquatic foraging grounds to woodlands thousands of kilometres away used as nesting grounds.



WHITE-TAILED EAGLE TREE NEST



Rhywogaethau Dangosydd -

Bioindicator Species

Both eagles are classed as indicator species can be used as useful management tools to help us delineate areas of conservation priority, indicate the status of environmental conditions, find a disease outbreak, or monitor pollution or climate change. In one sense, they can be used as an “early warning system” by biologists and conservation managers.

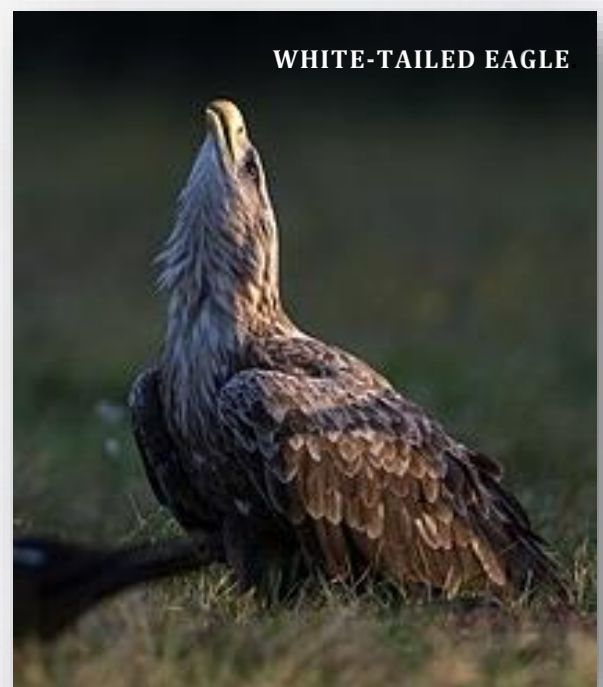
SENTINEL SPECIES

The Golden Eagles presence, absence or abundance reflects the specific environmental conditions of upland habitats. By contrast, White-tailed Eagles abundance reflects the specific environmental conditions of freshwater and marine habitats.

Both eagle species are indicator species in their habitats and can signal change in the biological condition of a particular ecosystem, rendering eagles as ‘proxy’ indicators to diagnose the health of an ecosystem.

For example, the White-tailed Eagle can be used as ‘proxy’ indicators of water quality, as these species are associated to heathy, clean coastlines or freshwater habitats.

Similarly, many upland mountainous habitats across the globe harbor Golden Eagles and the health of these eagle populations is used as an indicator of the health of upland soil and vegetation quality and biodiversity.



Hyrwyddwyr Cadwraeth -

Conservation Champions

Both Eagles have been important species to Welsh culture and heritage but can also act as ambassadors, icons or symbols for endangered spaces and biodiversity if restored back to Wales.

FLAGSHIP SPECIES

Both species were once widespread across historic Wales prior the 18th Century and were both Welsh cultural icons. Records for the presence of both species were first recorded in Welsh archaeological accounts, dating back to the Neolithic period over 4,500 years ago. Eagles also held a spiritual significance to Welsh culture, largely from the Celtic era, where the Celtic name for Snowdonia, was Eryri, meaning 'the place of the eagle' and hailed the eagle as the oldest animal in the world.

Eagles were often oracles to the Welsh community, giving advice and foretelling the army's fortunes in battle. This myth generally applied to the Golden Eagle, where a high-soaring eagle meant victory. Welsh Celts, however, generally relate to White-tailed Eagles, which were often associated with warfare from habits of scavenging corpses on the battlefield. Archaeological evidence suggests that they left dead bodies to be consumed by eagles. In other evidence, the abundance of Welsh place-names, incorporating the Welsh word for eagle - 'eryr', also confirms their significance to Welsh heritage and culture.

WHITE-TAILED EAGLE



As both species are of cultural importance to Wales, their iconic and charismatic status enables them to be important flagship species for many Priority Habitats in Wales. Many of our terrestrial, coastal and freshwater habitats are enlisted as Habitats of Principal Importance in Wales (e.g. heath, grasslands, coastal sediment, rivers, lakes and ponds). Both species are able to support the conservation role of 'Conservation Champions' to highlight the conservation importance of these special places and its associated biodiversity.

Rhywogaethau Gwarchodedig

Protected Species

The Golden and White-tailed Eagle are both protected species at a National and International level. The conservation strategies implemented across the globe to protect both species and their habitats can benefit their ecosystems by providing additional secure spaces for a wide-range of biodiversity.

PROTECTION

The Golden and White-tailed Eagle are both species *of National and International Conservation Concern* based upon the extent of habitat alteration and degradation, illegal persecution, and pollution. At a species level, both are **Schedule 1** species enlisted under the **Wildlife and Countryside Act (1981)** and are protected across Britain against illegal killing and intentional or reckless disturbance.

Both species are also enlisted on **Annex 1 of the EU Wild Birds directive (2009/147/EC)**, this allows both species to gain site and species protection within the UK.



SPECIAL PROTECTED AREAS (SPA)

Special Protected Areas (SPAs) are used to protect both eagles breeding and wintering habitats.

Golden Eagles require a lot of space to breed and by allocating large protected areas around eagle nest sites, **also provides secure spaces for other biodiversity**. Typically, an area larger than 7, 000 km² may be allocated for these species in Britain.

For White-tailed Eagles Special Protected Areas (SPAs) are also the core conservation strategy for species and site protection for the eagles in Europe



A All Eryrod Ddychwelyd i Gymru?

Can Eagles Return to Wales?

The modern landscape has changed significantly since eagle species last bred in Wales, over 150 year ago. ***The Eagle Reintroduction Wales (ERW) project*** are collating scientific evidence to assess if the modern Welsh landscape can still support the Golden and White-tailed Eagle.

Our preliminary analysis indicates that there is a ***good proportion of suitable breeding habitat for both species in Wales***. With both breeding populations being too far north, there is little chance of breeding eagles naturally colonizing Wales, in the near future. A reintroduction of both or either species to will ***contribute to Welsh, National and International conservation legislation*** to increase and

We now have bio-geographic areas highlighted that indicate suitable breeding areas for eagles across Wales. ***Suitable habitat, however, does not mean that they are available for eagles to occupy today***, simply due habitat conditions, perils from people and land use change (e.g. prey numbers, persecution incidents, windfarms, human disturbance etc.). Our journey still continues to assess the proportion of available eagle habitat for both the ***Eryr euriad*** and ***Eryr y môr*** in Wales.



ADDITIONAL READING:

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Sekercioglu, C.H. (2006). Increasing awareness of avian ecological function. *Trends in Ecology and Evolution* **21**. Available at: <http://dx.doi.org/10.1016/j.tree.2006.06.007>

