
streamscapes | biodiversity
THE
BOG
REVEALED
Essential Knowledge
& Resources

Safety first!

The ‘StreamScapes’ programme involves a hands-on survey of your local landscape and waterways. Safety must always be the underlying concern. If you are undertaking an aquatic survey, remember that all bodies of water including bogs, are potentially dangerous places.

When visiting bogs, take care to avoid unstable ground, hidden water bodies, and deep, waterlogged areas, wear sturdy, waterproof footwear to prevent slipping or sinking, and be aware of changing weather conditions, which can make the terrain more hazardous.

If you and your group are planning a field trip visit to conduct an assessment, ensure that you have a good ratio of experienced and water-friendly adults to students, keep clear of danger, and insist on discipline and caution!

Notes for Teachers

For schools undertaking ‘The Bog Revealed: Essential Knowledge & Resources’, you will be supplied with copies of this book and access to ‘The Bog Revealed’ course content. It is recommended that the teacher facilitates the class going through this booklet in a single session, followed by an optional field trip or online session with StreamScapes staff educators.

Acknowledgements

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Reference materials include “Peatlands: Form and Function” by Edward Maltby; “Ireland’s Peatland Heritage” by John Feehan; “The Role of Peatlands in Climate Regulation” by Smith et al.; “Biodiversity of Irish Bogs: An Overview” by O’Connell et al. Special thanks to Aga Grandowicz, naturalworlddesign.ie; Mark Boyden, Coomhola Salmon Trust; Julia Cooper; and all ‘StreamScapes’ staff & participants.

Peatlands in Ireland: understanding bogs

A bog is a type of wetland that accumulates peat, a deposit of dead plant material—often mosses, primarily sphagnum moss. Bogs are a subtype of peatland, which also includes fens, swamps, and marshes. In Ireland, bogs are an essential part of the landscape, covering approximately 20% of the country’s land area.

Bogs develop in areas where the water at the ground surface is acidic and low in nutrients. These conditions lead to the slow decomposition of plant material, resulting in the accumulation of peat. There are two main types of bogs:

1. **Raised bogs:** Found in the central lowlands of Ireland, raised bogs are dome-shaped and formed over thousands of years as layers of peat accumulated in former lake basins.

2. **Blanket bogs:** Located in the western and upland regions, blanket bogs cover the landscape like a “blanket.” They are formed in areas with high rainfall and poor drainage, allowing peat to develop over a wide area.

Carbon storage and climate regulation

- Bogs are significant carbon sinks, meaning they store large amounts of carbon that would otherwise be released into the atmosphere as carbon dioxide, a greenhouse gas. Peatlands store more carbon than all other vegetation types in the world combined.
- The preservation of bogs is vital for climate regulation. When bogs are drained or disturbed, the stored carbon is released, contributing to global warming.

Biodiversity and unique habitats

- Bogs support a variety of plant and animal species that are specially adapted to the acidic, waterlogged conditions. In Ireland, bogs are home to several unusual species, including carnivorous sundews, bog-rosemary, and various orchids.
- Unique wildlife such as the Irish hare, snipe, and curlew, as well as rare insects, thrive in these habitats. Bogs also serve as crucial breeding grounds for many bird species.

Water regulation and purification

- Bogs play a critical role in water management by regulating the flow of water through the landscape. They act like sponges, absorbing rainwater and slowly releasing it, which helps to reduce flooding.
- The natural filtration process within bogs helps to purify water, removing pollutants and improving water quality downstream.

Characteristics of a good bog

Hydrology

Water balance

A healthy bog maintains a high water table, with water levels close to the surface throughout the year. This waterlogged condition is crucial for peat formation and maintaining the bog's ecological balance.

Acidic conditions

The water in bogs is typically acidic (low pH), which limits the types of plants and animals that can survive there, contributing to the unique biodiversity of bogs.

Peat Formation

Low nutrient levels

Bogs are nutrient-poor environments, which is why only certain specialised plants can thrive there. This low-nutrient condition is essential for the survival of bog-specific species.

Slow decomposition

The waterlogged, acidic conditions of bogs slow down the decomposition of organic material, particularly sphagnum moss, leading to the gradual accumulation of peat.

Layering

Over time, peat accumulates in distinct layers, with the oldest material at the bottom. These layers can provide a historical record of the bog's development.

Biodiversity

FLORA

SPECIALISED PLANT SPECIES

Spagnum

Spagnum is the cornerstone of bog ecosystems. This group of mosses is highly water-retentive, capable of holding up to 20 times its weight in water, which is crucial for maintaining the bog's wet and acidic environment. The slow accumulation of dead sphagnum material is what forms peat over time.

Role in the ecosystem: By creating acidic conditions, sphagnum mosses inhibit the growth of most other plants and slow the decomposition of organic material, facilitating the continuous buildup of peat. There are over 30 species of sphagnum moss in Ireland, each adapted to different micro-habitats within a bog.

Cottongrass *(Eriophorum spp.)*

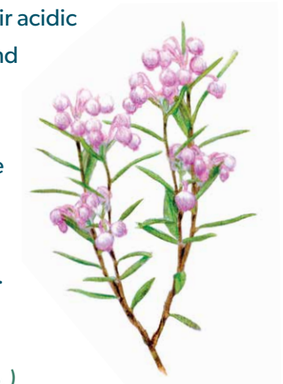
Cottongrass is easily recognisable by its fluffy, white seed heads that resemble tufts of cotton. It is one of the most common plants in Irish bogs and thrives in the wet, acidic conditions found there.

Role in the ecosystem: Cottongrass is well adapted to the nutrient-poor soils of bogs. Its deep root system helps stabilise the peat and prevent erosion. The plant also plays a role in the carbon cycle by fixing carbon during photosynthesis and eventually contributing to the peat layer as it decomposes.

Bog-rosemary *(Andromeda polifolia)*

Bog-rosemary is a low-growing, evergreen shrub with narrow, needle-like leaves and small, bell-shaped pink flowers. Despite its name, it is not related to culinary rosemary.

Role in the ecosystem:
This plant is well adapted to the harsh conditions of bogs, particularly their acidic soils. It provides food and habitat for various insects and contributes to the biodiversity of the bog by thriving in an environment where few other plants can survive.



Sundew *(Drosera spp.)*

Sundews are small, carnivorous plants that trap insects on their sticky, gland-covered leaves. They are one of the most fascinating plant species in bogs due to their carnivorous nature.

Role in the ecosystem: The sundew's ability to derive nutrients from insects allows it to survive in the nutrient-poor soils of bogs. By digesting insects, sundews obtain essential nutrients like nitrogen, which are scarce in bog.

Heath plants (e.g. Heather – *Calluna vulgaris*)

Heather is a common sight in bogs, with its purple-pink flowers adding colour to the otherwise muted landscape. This woody shrub is highly tolerant of acidic and nutrient-poor conditions.

Role in the ecosystem: Heather provides shelter and food for various wildlife, including insects and birds. Its dense root system also helps bind the peat and prevent erosion.

Bog asphodel *(Narthecium ossifragum)*

Bog asphodel is a small, perennial plant with bright yellow, star-shaped flowers that bloom in summer. Its vibrant flowers provide a striking contrast to the otherwise muted colours of the bog. The plant grows in dense, wet areas of bogs and moorlands, thriving in the acidic, nutrient-poor conditions that characterise these habitats.

Role in the ecosystem:
Bog asphodel plays a significant role in bog ecosystems by providing nectar for pollinators, such as bees and flies, and contributes organic matter to the peat layer as it decomposes. Additionally, the plant is an indicator species for acidic, wet soils, helping ecologists assess the health and characteristics of bog habitats.

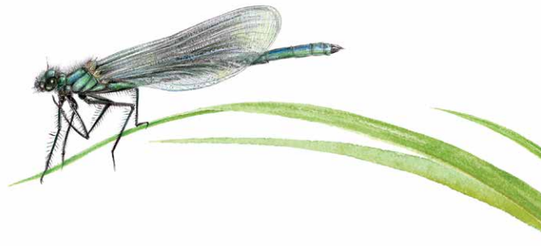
FAUNA

INSECTS

Dragonflies and Damselflies *(Odonata)*

These large, colourful insects are often seen hovering over bog pools during the warmer months. Dragonflies and damselflies have aquatic larvae, which thrive in the bog's waterlogged conditions.

Role in the ecosystem: Both as larvae and adults, these insects are an important element of the food chain in bog ecosystems, feeding mainly on smaller insects.



Bog hoverfly *(Eristalis cryptarum)*

This rare hoverfly species is closely associated with bogs. It mimics bees in appearance and is often seen feeding on the nectar of bog flowers.

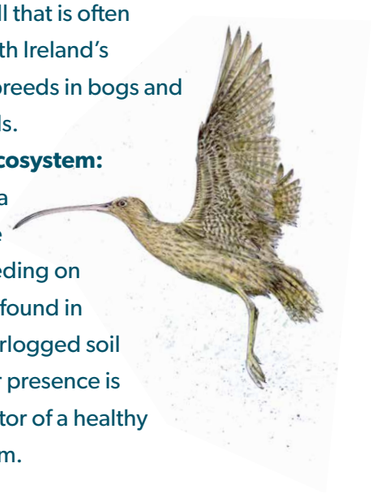
Role in the ecosystem:
The bog hoverfly is an important pollinator, helping to fertilise various bog plants, including heathers and other flowering species.

BIRDS

Curlew *(Numenius arquata)*

The curlew is a large wading bird with a distinctive long, down-curved bill and a haunting call that is often associated with Ireland's boglands. It breeds in bogs and wet grasslands.

Role in the ecosystem: Curlews play a key role in the food web, feeding on invertebrates found in the soft, waterlogged soil of bogs. Their presence is also an indicator of a healthy bog ecosystem.



Snipe *(Gallinago gallinago)*

The snipe is a small, well-camouflaged bird with a long straight bill, which it uses to probe the mud for food. Its erratic flight pattern when disturbed is characteristic.

Role in the ecosystem: Snipe feed on insects, worms, and other small invertebrates. They require wet, marshy conditions for breeding, making them dependent on healthy bogs.

Hen Harrier *(Circus cyaneus)*

The hen harrier is a medium-sized raptor with striking plumage. The male is pale gray with black wing tips, while the female is brown. This bird is often seen gliding low over the bog in search of prey.

Role in the ecosystem: As a top predator, the hen harrier predates on small mammals and birds within the bog, helping maintain the ecological balance.

MAMMALS

Irish Hare *(Lepus timidus hibernicus)*

The Irish hare is a subspecies of the mountain hare, endemic to Ireland. It has adapted to a variety of habitats, including bogs, where it finds food and shelter.

Role in the ecosystem: The Irish hare is an important herbivore in the bog ecosystem, feeding on grasses and shrubs. It also serves as prey for predators such as foxes and birds of prey.

Otter *(Lutra lutra)*

Although more commonly associated with rivers and lakes, otters can also be found in bogs, particularly where there are pools and streams.

Role in the ecosystem: Otters are top predators feeding on fish and amphibian populations within bog ecosystems. Their presence is a sign of a healthy, well-functioning wetland.

AMPHIBIANS

Common Frog *(Rana temporaria)*

The common frog is one of the few amphibians that can be found in bogs. It breeds in the shallow pools that form in these wetlands.

Role in the ecosystem: Frogs feed on the myriad of insects and other invertebrates found in bogs and serve as prey for various birds and mammals. Their tadpoles contribute to nutrient cycling within bog pools.

REPTILES

Viviparous Lizard *(Zootoca vivipara)*

The viviparous lizard is the only reptile native to Ireland and can sometimes be found basking on sunny patches within bogs.

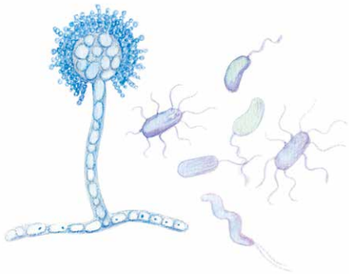
Role in the ecosystem: As insectivores, these lizards contribute to the functioning of the food chain by feeding on small invertebrates. Their presence also adds to the overall biodiversity of bogs.

MICROBIAL LIFE

Decomposers

The microbial community in bogs, including bacteria and fungi, is crucial for the slow decomposition of organic matter, particularly sphagnum moss.

Role in the ecosystem: These microbes play a critical role in peat formation by breaking down plant material at a slow rate, which allows peat to accumulate over centuries. They also contribute to nutrient cycling within the bog.



Benefits of a good bog

Carbon sequestration

Bogs act as long-term carbon sinks, trapping carbon dioxide in the form of peat. This process is essential for mitigating climate change.

Flood control

By absorbing large amounts of water and releasing it slowly, bogs help to regulate water flow and reduce the risk of floods downstream.

Biodiversity hotspots

Bogs support a diverse range of species, many of which are rare or endangered, making them critical areas for conservation.

Water purification

The bog's filtration system removes pollutants and improves water quality, benefiting the surrounding ecosystems and human communities.

Threats to bogs

Drainage and land use changes

Agricultural expansion

Draining bogs for agriculture lowers water tables, leading to the degradation of peat and loss of bog-specific biodiversity.

Forestry

Planting trees on or near bogs can alter hydrology and lead to the drying out of bogs.

Development

Urban and industrial development can destroy bogs, leading to the loss of their ecological functions.

Peat extraction

Peat is often harvested for use as fuel or in horticulture, but this extraction destroys bog ecosystems and releases stored carbon into the atmosphere.

Climate change

Changes in temperature and precipitation patterns can affect the water balance of bogs, potentially leading to drying and the disruption of peat formation.

Conservation and restoration of bogs

Protection measures

Legal protections

A sample of bogland habitat is now protected under International, European and Irish laws including the Ramsar Convention on Wetlands, the EU Habitats Directive and the Wildlife Acts.

Nature reserves

Some bogs have been designated as nature reserves, protecting them from development and other threats.

Conservation programs

Citizen action – private peatland owners often work with community members and non governmental organisations to protect and restore peatland habitat.

Restoration techniques

Re-wetting

Blocking drainage ditches and reintroducing water to dried-out bogs helps to restore the water table.

Reintroducing native vegetation

Reintroducing sphagnum moss and other native plants can help re-establish the conditions necessary for peat formation.

Community and Education

Local Involvement

Engaging local communities in bog conservation can lead to better protection and restoration outcomes.

Education

Public awareness campaigns can educate people about the importance of bogs and encourage conservation efforts.

Illustration above: marsh fritillary butterfly

Learn more

National Parks and Wildlife Service (NPWS)

The National Parks and Wildlife Service (NPWS) is responsible for the conservation of Ireland's natural heritage, including its bogs and wetlands. The NPWS manages nature reserves, special areas of conservation, and national parks, many of which include bog habitats. Their website offers extensive information on the biodiversity of these areas, conservation efforts, and opportunities for public engagement. For those looking to learn more about Ireland's bogs, or to visit protected sites, the NPWS provides guides, maps, and educational content to deepen understanding of these important ecosystems.

Irish Peatland Conservation Council

The Irish Peatland Conservation Council (IPCC) is a leading source of information on bogs and peatlands in Ireland. Their website offers a wealth of educational resources, including factsheets, publications, and research on peatland ecosystems. Visitors can learn about peatland restoration projects, explore the Bog of Allen Nature Centre, or even get involved in conservation initiatives. The IPCC also provides opportunities for volunteering and citizen science, allowing people to actively contribute to the protection of these vital habitats.

Community Wetlands Forum

The Community Wetlands Forum offers valuable resources for anyone interested in learning more about wetlands and bogs. Through its network of local communities and conservation groups, the forum provides educational materials, project updates, and practical guides on wetland conservation. Their website features a range of information on how individuals and communities can get involved in wetland restoration projects. For those wanting to explore more about the role and significance of wetlands in Ireland, the forum is a great starting point for both awareness and action.

National Biodiversity Data Centre

The National Biodiversity Data Centre is a key resource for anyone looking to learn more about Ireland's biodiversity, including its bogs and wetland ecosystems. The centre collects and shares data on the distribution and status of Ireland's wildlife, making this information publicly accessible through its online data portal. It offers tools for identifying species, resources for citizen scientists, and a wealth of biodiversity reports. For those interested in bogs, the centre provides valuable data on the species that inhabit these ecosystems and offers opportunities to contribute to conservation efforts by submitting wildlife sightings or participating in biodiversity monitoring programmes.

How you can help

Volunteering

Opportunities exist to volunteer with local conservation groups, helping with bog restoration activities like re-wetting and planting native species.

Advocacy

Raising awareness about the importance of bogs and advocating for their protection can make a significant difference. This can include writing to policymakers, participating in campaigns, or sharing information on social media.

Household Best Practices

Home truths

The StreamScapes method views our toilets, sinks, baths and showers as tributaries to our rivers. What we put in them has a huge capacity to impact on local water quality and biodiversity.

Outside our homes in our gardens and yards we have an equal ability to create or destroy natural habitats. These tips will help restore water quality & biodiversity.

Avoid any cleaning products with **phosphates** or **bleach** – they spoil the good work of your sewage treatment plant / septic tank, leading to aquatic pollution – use instead '**eco-friendly**' products.

Use the **minimum of any cleaning product** – enough is enough.

Do not use in-sink food macerators (they put added strain on sewage treatment) – compost your vegetable wastes and use as fertiliser in your garden.

Any common household product labelled **hazard** or **poison** or **irritant** must be treated as toxic waste when disposing of – follow Local Authority guidelines and do not put in drains!

Keep your garden low-maintenance and low water- dependent, but covered in established sod (and not hard-surfaced) to avoid contributing to peak urban rainfall run-off. Use native plants and trees to establish suitable local habitats.

Avoid herbicides, pesticides, and application of fertilisers – find natural ways to garden.

Finally, control your use of water at home and in the garden – treat it as the precious substance that it is.

Notes & reflections

Bogs have long shaped Ireland's cultural landscape, inspiring generations of artists, poets, and storytellers who recognise the unique nature of these ancient wetlands. As you explore the beauty and mystery of the bog, use the space below to create your own sketches, notes, or reflections.

About StreamScapes

StreamScapes is a leading environmental non-profit organisation committed to the conservation of Ireland's aquatic ecosystems. Our mission is to protect and enhance water bodies across the country by empowering communities, schools, and individuals to actively participate in environmental stewardship. Through innovative education, research, and community engagement, we inspire sustainable practices that protect Ireland's natural heritage.

StreamScapes offers hands-on, place-based learning programmes that are aligned with national curricula and tailored to diverse audiences. We collaborate with schools, citizen scientists, local businesses, and families, providing resources and workshops that encourage practical conservation efforts. One of our key initiatives involves engaging citizen scientists to contribute to vital research and the monitoring of water quality and biodiversity.

By fostering collaboration with local communities and environmental organisations, StreamScapes empowers people to become proactive custodians of Ireland's water bodies. Through education and engagement, we aim to safeguard these precious ecosystems for future generations. For more information on our programmes and conservation efforts, visit StreamScapes.ie

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streamscapes
the waters & the wilds

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