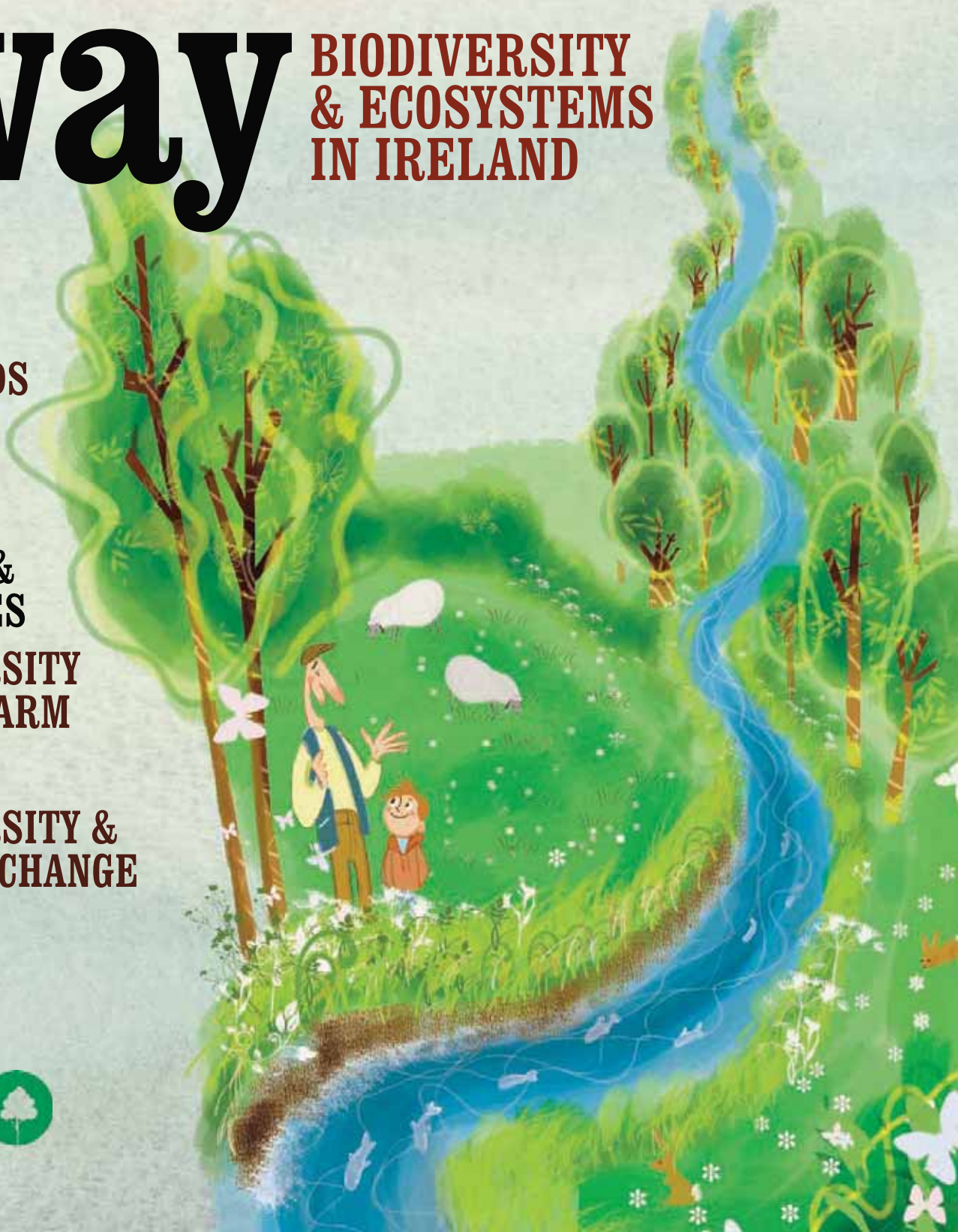
nature's way

BIODIVERSITY & ECOSYSTEMS IN IRELAND



BOGS, WETLANDS & FLOOD CONTROL

WATER QUALITY & FISHERIES

BIODIVERSITY ON THE FARM

SEA LIFE

BIODIVERSITY & CLIMATE CHANGE

An Taisce

2010 International Year of BioDiversity

How does **a bog** prevent  ?

How does **a marsh** help keep  happy?

How does **a hedge** stop  ?

How does **a tree** prevent  ?

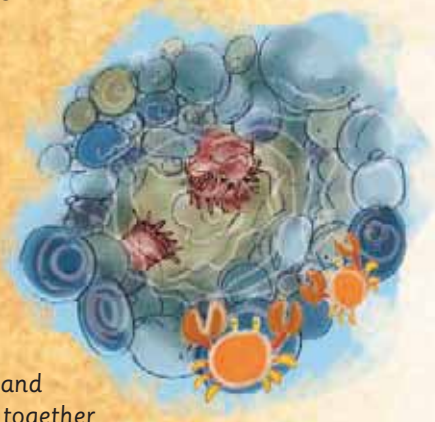
To find out the answers, we must find out a bit more about biodiversity and ecosystems services.

Biodiversity and ecosystems services are the basis of human existence and crucial to our wellbeing. But today we have become so far removed from nature that we have forgotten how much we still rely on it. Because of this, many ecosystems are being damaged by our activities and we are losing many of the services provided by nature. Only if we can learn to recognise and value these services properly will we be able to make sure that they are still there for future generations to benefit from, as we are now.

Biodiversity loss is our loss

what is biodiversity?

Biodiversity is our life support system. It is the variety of all life forms on Earth, from the tiniest bugs living in the soil to the butterflies in your garden, the plants they feed from, and the biggest whales in the sea. Biodiversity includes the diversity of individuals within a species (genetic diversity), diversity of species within an ecosystem or habitat (species diversity) and the diversity of ecosystems or habitats (habitat diversity).



what is an ecosystem?

An ecosystem is a community of plants, animals, fungi and micro-organisms that live, feed, reproduce and interact together in the same area or environment. Irish examples include a bog, a woodland, a marsh, a hedge, a lake, or even a rock pool.

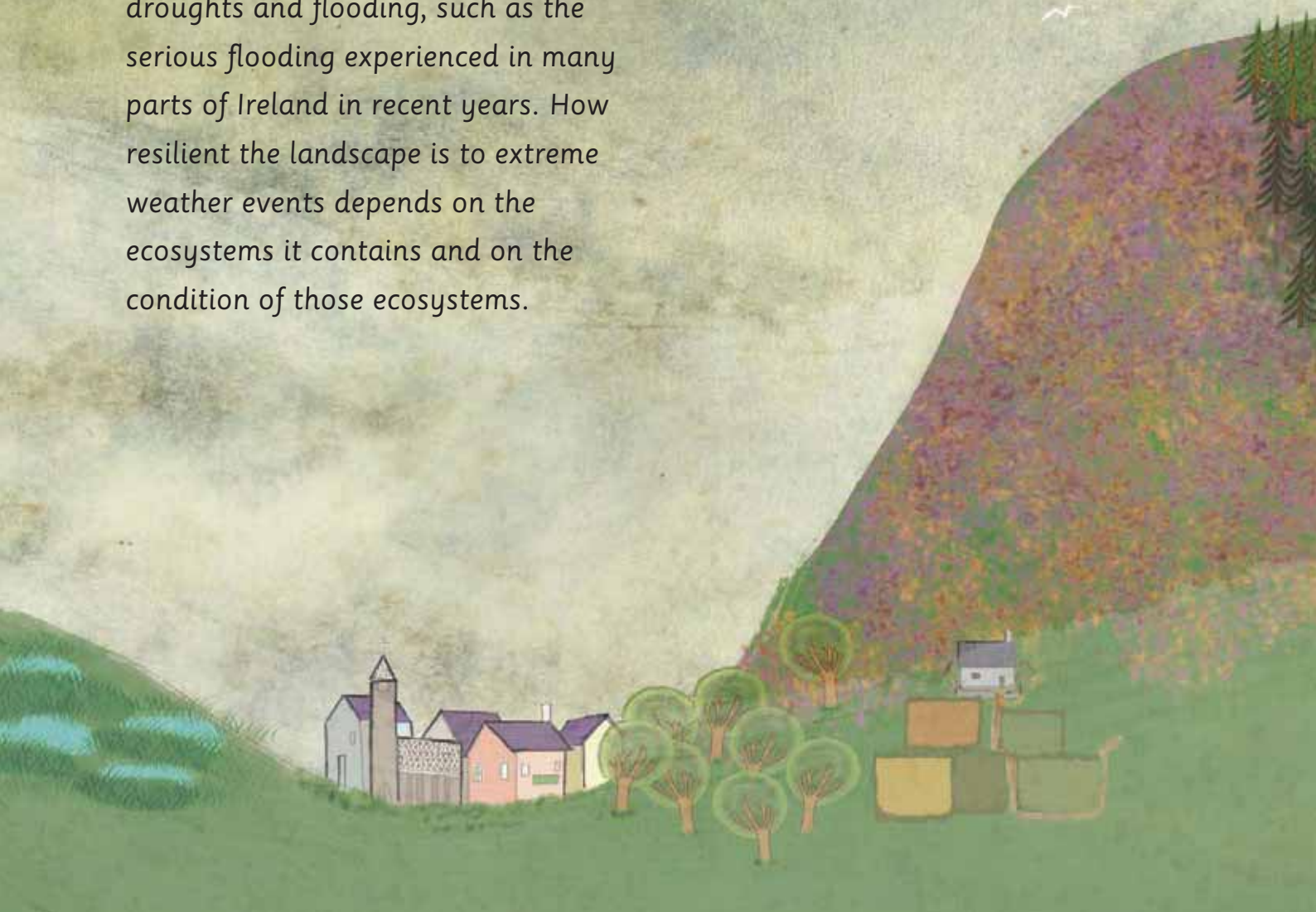
what are ecosystem services?

Ecosystems services are the wide ranging benefits of ecosystems. Ecosystems protect us from flooding, regulate climate, breakdown wastes and recycle nutrients, filter and purify water, maintain soil fertility, purify our air, control insects pests, and provide goods such as wood, textiles, and of course food. These are all examples of 'ecosystems services'. All agriculture depends on biodiversity, as do marine and fresh water food resources.

Bogs, wetlands & flooding

Water, water, everywhere

Climate change is causing severe weather events like long cold spells, droughts and flooding, such as the serious flooding experienced in many parts of Ireland in recent years. How resilient the landscape is to extreme weather events depends on the ecosystems it contains and on the condition of those ecosystems.



How bogs protect us from flooding

Peat bogs absorb and store huge amounts of water, like great big sponges. This is because peat is made up of *Sphagnum* mosses, which are like little sponges that grow and grow as long as they are wet. They hold their shape whether wet or dry, and soak up to 20 times their dry weight in water. *Sphagnum* mosses absorb a huge amount of water and, after heavy rain, this water is released slowly into streams and rivers, reducing flood peak and hence reducing the severity of flooding downstream.

In this way peat bogs help to prevent flooding in villages, towns and on farmland. Other wetlands, such as wet lake margins and marshy floodplains, also contain a lot of water and provide space for excess water to gather when there is a lot of rain and risk of flooding.

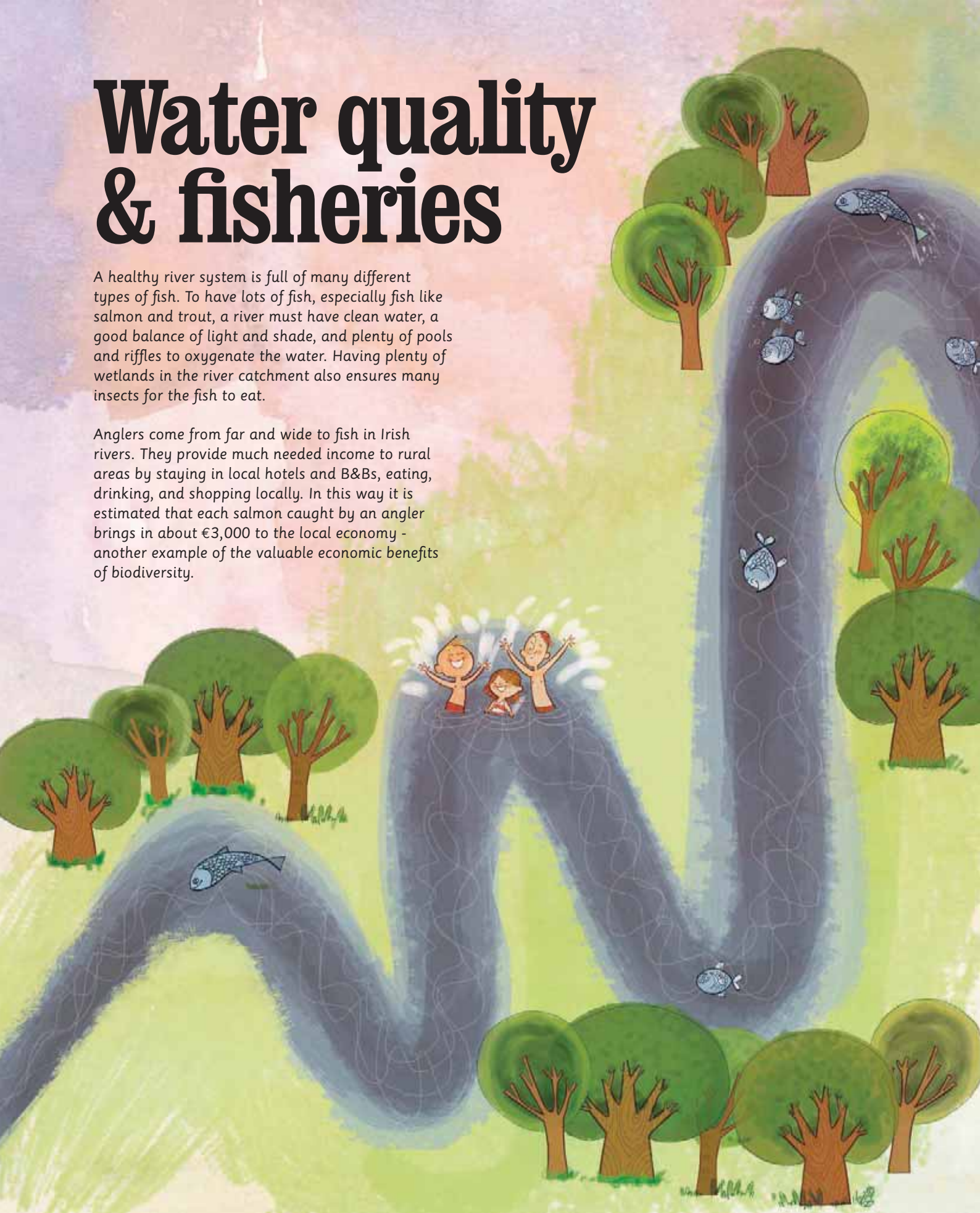
Protecting our bogs (from us)

Sphagnum mosses need to be wet most of the time in order to survive. This is why, when a bog is drained, the *sphagnum* mosses die off and the bog loses its ability to absorb heavy rains and prevent flooding downstream. To keep this flood prevention service, we must stop draining peat bogs. Bogs are drained for harvesting peat moss, for planting forestry and for turf cutting. Many countries around the world are actively conserving and even creating wetlands, including bogs, because it is one of the best ways to prevent flooding. Ireland only has about 10% of our original bogs left, and they are still being actively destroyed. We all have a lot to do if we are going to halt the loss of our peat bogs and wetlands in time to protect us from the more severe flooding expected over coming years. Conservation and creation of wetlands is one of the most effective (and inexpensive) protective measures against flooding.

Water quality & fisheries

A healthy river system is full of many different types of fish. To have lots of fish, especially fish like salmon and trout, a river must have clean water, a good balance of light and shade, and plenty of pools and riffles to oxygenate the water. Having plenty of wetlands in the river catchment also ensures many insects for the fish to eat.

Anglers come from far and wide to fish in Irish rivers. They provide much needed income to rural areas by staying in local hotels and B&Bs, eating, drinking, and shopping locally. In this way it is estimated that each salmon caught by an angler brings in about €3,000 to the local economy - another example of the valuable economic benefits of biodiversity.



Keeping our rivers clean

Rivers can be polluted in lots of ways. A river that has been straightened out and dredged does not have the diversity of habitats needed to support a healthy fishery. Excess fertilisers seeping from forestry or farmland into a river will cause the water chemistry to change in such a way that fish and other wildlife cannot live there. Leakage from septic tanks has the same effect, along with other sewage treatment works. Pesticides from forestry and agriculture pollute water, too. According to the latest figures, one third of Irish rivers are polluted. We need to make a really big effort to change the way things are done and stop polluting our waters if we are to restore healthy aquatic ecosystems and plentiful fish.

All of our activities, from building to farming, from industry to forestry, can be managed in a way that ensures the restoration of good water quality in Irish streams and rivers. The streams and rivers will benefit and society will continue to enjoy the services that they provide.

Ireland's longest living animal?

The freshwater pearl mussel lives in some Irish rivers. It is Ireland's longest living animal, living up to 140 years of age! This means that many of the pearl mussels living in Irish waters today were alive during the 1916 rising! Freshwater pearl mussels thrived in many Irish rivers for thousands of years, but because we have polluted so many rivers over the past 50 years, this species is now in danger of becoming extinct in Ireland. Most of the remaining populations do not have clean enough water to reproduce, so a really big effort is needed to clean up the rivers where viable populations remain and to prevent this animal from becoming extinct. This means protecting water from nutrient enrichment, from pesticides and from silt entering rivers.

Biodiversity on the farm

Why have hedges?

Irish farmland is characterised by a patchwork of hedge-bound fields. Hedges are a man-made feature, and were planted on farms with good reason: to keep farm animals in the fields where they are supposed to be and to provide these same animals, and crops, with shelter from wind, rain and strong sun. There are many other ways that trees and hedges provide an important service. They prevent soil erosion by shielding land from wind. They trap soil particles, preventing soil from running into streams and rivers, where it causes pollution to fish and other river wildlife.

Hedges support lots of wildlife, too. They are like green veins running through the landscape, or corridors for the dispersal of wildlife throughout the countryside. Two-thirds of Irish birds nest in hedgerows. Bats use hedges to roost in and to fly along as they shelter from wind and from predators. One bat also eats about 4,000 midges per night! That is 600 midges per hour, per bat.

"If the bee disappeared off the surface of the globe then man would only have four years of life left." Albert Einstein

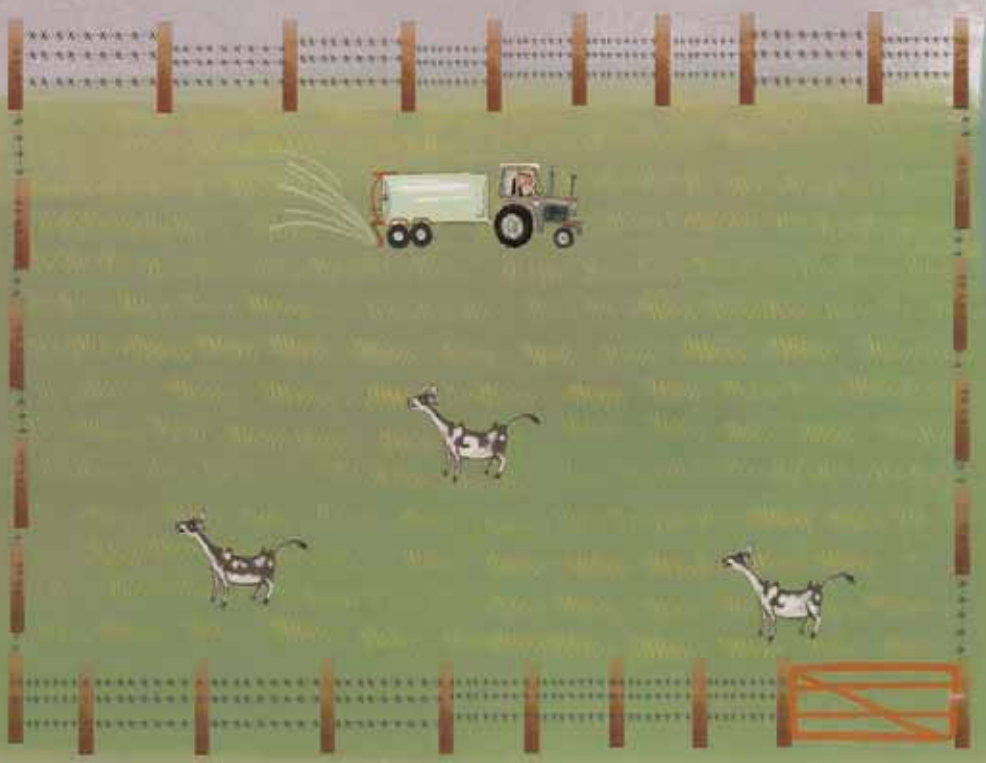
Bees Please

Hedges also support bees, which are extremely valuable as crop pollinators. Bees pollinate most fruits and vegetables, including apples, strawberries, onions and carrots, and help maintain nitrogen-fixing clover flowers in grassland. Bees nest in undisturbed soil in hedge banks or hay meadows, and depend on a range of wild flowers and plants which, in turn, often depend on other insects, birds or mammals to reproduce and disperse. In Ireland we are losing many of our bees through agricultural intensification.

Farming would be impossible without ecosystem services. Another example of this is the thousands of little soil organisms and earthworms that live in the soil, mixing nutrients and air, and changing the structure of the soil - without whom nothing would grow. This basic, vital service is being threatened by over-use of chemical pesticides and machinery. Even beetles that live in soil and hedges provide a valuable ecosystem service. They eat other insects that are crop pests, helping to control pests on the farm.

Trees on the farm

Growing trees on the farm has lots of benefits, to the farmer, to wildlife, and to all of us. Well-managed small woodlands provide valuable timber, year after year. There are lots of native tree species that are suited to every land type and with lots of different uses. Having a mix of different types of trees will provide the greatest benefits for the farmer and for wildlife. Native trees provide homes to a range of minibeasts, birds and bats. Coniferous forests have a poorer plant and animal diversity. Fruit trees and nut trees on the farm can give an abundant supply of food for many years. Trees also help to maintain soil fertility, purify the air and provide oxygen for us to breathe, and lock away carbon dioxide gas that is causing climate change.



Sea life

Seafood is an enormously important food source for humans. Areas of the sea that are close to land contain more biodiversity than the open ocean. These areas also contain over 90% of marine fishing grounds. Small fisheries and the activities that support these fisheries employ more than 200 million people worldwide. Healthy ecosystems are needed to sustain fish populations. Important nursery habitats such as oyster beds and wetlands are where many fish species spawn and breed. 'Filter feeders' in the sea and coastal wetlands clean and remove toxins from water, helping to keep nursery areas clean enough for the young fish. In Ireland our shellfish populations of wild scallops, oysters and mussels are under pressure, both from over-harvesting and from ongoing pollution which makes it difficult to keep our shellfish waters clean.

Plenty of fish in the sea?

Through overfishing, one third of all commercially fished species have now disappeared. Since 1994 the amount of fish being caught worldwide has been continually dropping because of the collapse of so many fish populations. As much as 88% of European fish stocks are being harvested beyond 'Maximum Sustainable Yields'. This means that many stocks are not being given the chance to recover, even though relieving fishing pressure now would allow for bigger, sustainable catches in the future.

Fish farming

Although a greater proportion of the fish we now eat is farmed, fish farming is not going to solve falling wild fish populations. Indeed, fish farming can damage wild fish stocks, because many farmed fish are fed on huge quantities of small wild fish from overfished stocks. These 'feed fish' are caught in faraway places like the coasts of South America and from fisheries that are already under pressure. This means that fish farming here can cause fish stocks in other parts of the world to collapse.

Keeping the balance right

One of the noticeable effects of overfishing is that in areas where too many fish near the top of the food chain have been removed we see population explosions of jellyfish and algal blooms. This imbalance in the ecosystem impacts on many other marine species, not just the species that was overfished. At the Johannesburg World Summit on Sustainable Development in 2002, the EU and other international states committed themselves to harvesting no more than maximum sustainable yield by 2015.

As well as overfishing, many current fishing practices threaten other parts of the marine ecosystem. Animals such as dolphins and porpoises, turtles, sharks and seabirds get accidentally caught and die. Fishing practices such as bottom trawling are very damaging to sea-bed ecosystems. We need to make sure that we are all part of changing the way fish are caught to ensure that fisheries are sustainable and to protect the biodiversity in our oceans. This can be done by always asking, if you buy fish, where and how it was caught and by finding out which fisheries are certified as sustainable.

Ireland's coral reefs

Coral Reefs are some of the most biologically diverse habitats on the planet. Coral itself is made of tiny animals which secrete calcium carbonate, or limestone. Ireland has a large cold-water coral reef system about 200km off the west coast. There is still much to discover about Ireland's coral reefs, but already we know that they contain over 1,300 species of invertebrates and fish and can be as much as 13 km in length. These coral reefs are hugely important for sustaining a productive food chain in the deep sea.

Biodiversity & Climate Change

Trees for life

Trees and woodlands are important as a source of fuel, timber for building and furniture, and provide many other ecosystems services too. They are a valuable habitat for many wild plants and animals. Trees and woodland soils also lock up vast quantities of carbon. When trees are cut down stored carbon is released into the atmosphere as carbon dioxide and contributes to climate change. Annual emissions from deforestation make up 18% of global greenhouse gas emissions, greater than that produced by the entire global transport sector.

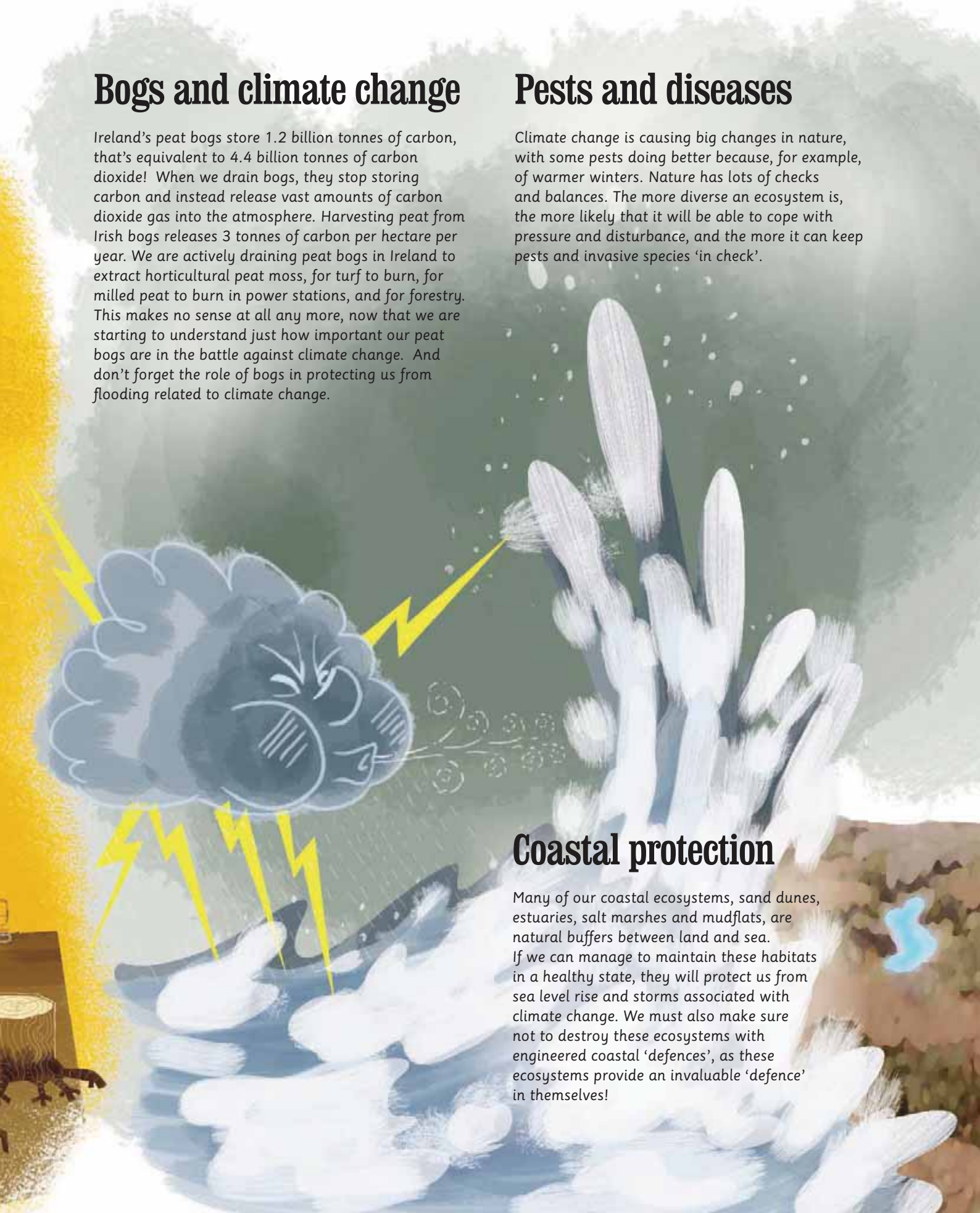
Ireland imports a lot of timber for floors, furniture and construction, that has been illegally felled from tropical forests. Illegal logging and the international trade in illegally logged timber drives deforestation and increases poverty in the developing world. Ireland is supporting this industry by importing so much illegally sourced timber. We can all play our part by only buying wood products that are certified as being from well-managed forests, such as FSC (Forest Stewardship Council) certified timber products. Other drivers of tropical deforestation are forest clearance for beef and soya production in South America, and palm oil and coffee in South East Asia.

Bogs and climate change

Ireland's peat bogs store 1.2 billion tonnes of carbon, that's equivalent to 4.4 billion tonnes of carbon dioxide! When we drain bogs, they stop storing carbon and instead release vast amounts of carbon dioxide gas into the atmosphere. Harvesting peat from Irish bogs releases 3 tonnes of carbon per hectare per year. We are actively draining peat bogs in Ireland to extract horticultural peat moss, for turf to burn, for milled peat to burn in power stations, and for forestry. This makes no sense at all any more, now that we are starting to understand just how important our peat bogs are in the battle against climate change. And don't forget the role of bogs in protecting us from flooding related to climate change.

Pests and diseases

Climate change is causing big changes in nature, with some pests doing better because, for example, of warmer winters. Nature has lots of checks and balances. The more diverse an ecosystem is, the more likely that it will be able to cope with pressure and disturbance, and the more it can keep pests and invasive species 'in check'.



Coastal protection

Many of our coastal ecosystems, sand dunes, estuaries, salt marshes and mudflats, are natural buffers between land and sea. If we can manage to maintain these habitats in a healthy state, they will protect us from sea level rise and storms associated with climate change. We must also make sure not to destroy these ecosystems with engineered coastal 'defences', as these ecosystems provide an invaluable 'defence' in themselves!

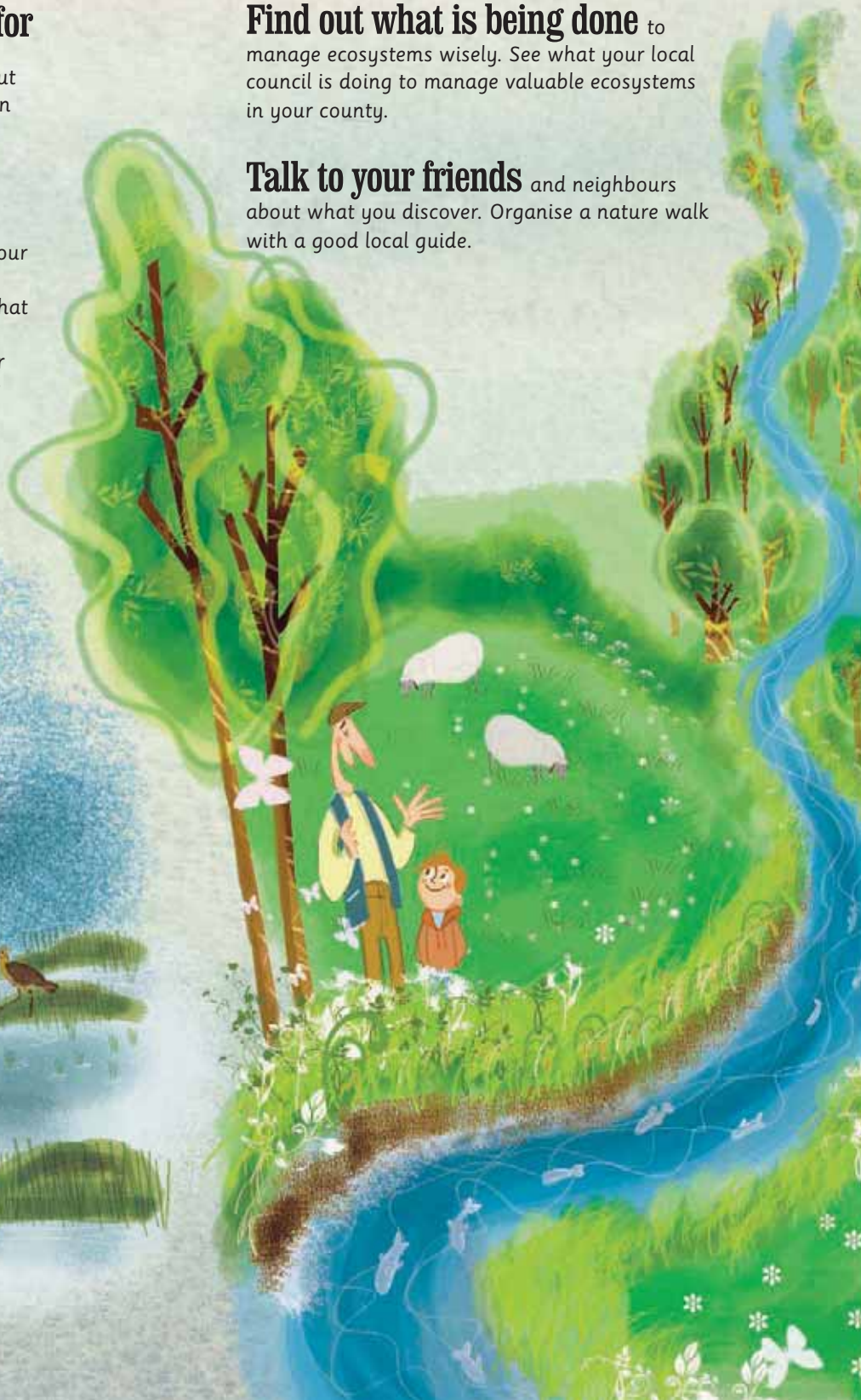
What can you do?

Become an active citizen for biodiversity! *Find out more about biodiversity and ecosystems services, in your own area and around the world.*

Get to know some special natural places *in your area, and find out as much as you can about them. Talk to neighbours, see what plants and animals live there, and find out the history of the area. Often older neighbours have a good sense of what ecosystems services are, even if the term is new!*

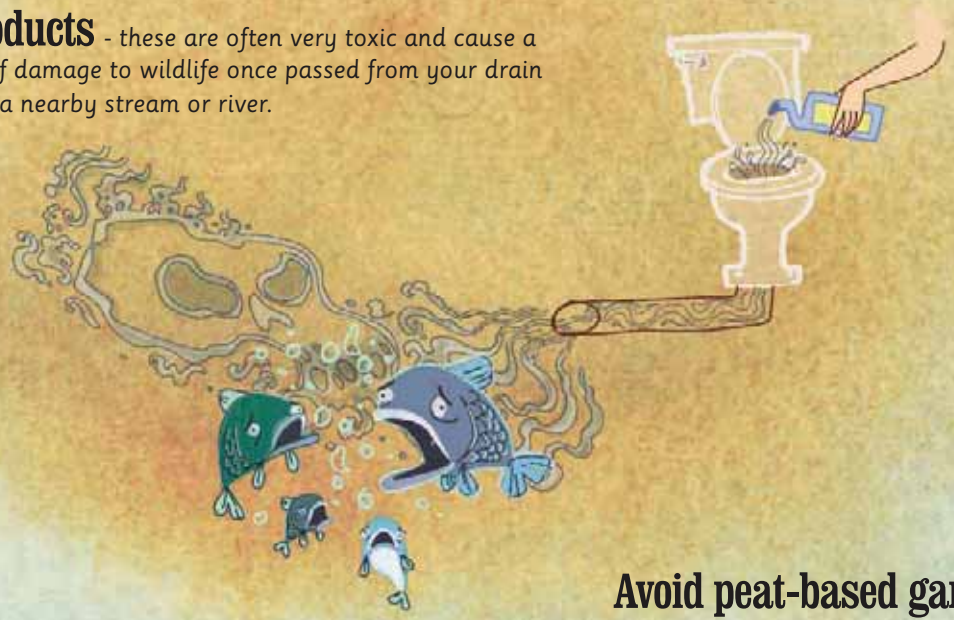
Find out what is being done *to manage ecosystems wisely. See what your local council is doing to manage valuable ecosystems in your county.*

Talk to your friends *and neighbours about what you discover. Organise a nature walk with a good local guide.*



Avoid using chemical cleaning products

- these are often very toxic and cause a lot of damage to wildlife once passed from your drain into a nearby stream or river.



Avoid peat-based gardening products

which mostly come from industrially harvested Irish bogs. Use peat free composts instead.

Slug pellets not only kill slugs,

they also end up poisoning birds and other wildlife that eat the toxic slugs.

Reduce your energy consumption,

turn off the heater, drive less and all the rest – Climate change and biodiversity loss are inextricably linked.

Participate in a biodiversity survey.

The National Biodiversity Data Centre runs national surveys of butterflies and other species groups. Environmental NGOs and Local Authorities often run surveys or collect biodiversity data too. By participating you can contribute to finding out more about biodiversity in Ireland.

Join an Irish environmental charity like An Taisce.

We are tackling these issues and need your support.

Booklet by Anja Murray of An Taisce
Illustrations by Cartoon Saloon
Designed by Public Communications Centre

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Contacts & further information:

An Taisce: An environmental charity with a focus on conserving Ireland's built and natural heritage – www.antaisce.org

Bat Conservation Ireland – www.batconservationireland.org

Birdwatch Ireland: conserving birds and biodiversity – www.birdwatchireland.ie

Biology.ie: A web based resource for people interested in biodiversity in Ireland – www.biology.ie

Coastwatch Ireland: planning, protection and management of Ireland's coastal zones – www.coastwatch.org

ECO-UNESCO: Ireland's environmental education and youth organisation – www.ecounesco.ie

Friends of the Irish Environment: A network dedicated to protecting Ireland's environment – www.friendsoftheirishenvironment.net

The Hedgelaying Association of Ireland: Promotes good management and conservation of hedgerows – www.hedgelaying.ie

Heritage in Schools Scheme: Heritage in Schools scheme is a Heritage Council Initiative offering a panel of heritage specialists who will visit a primary school at the teachers request – www.heritagecouncil.ie/education/

Irish Environmental Network: A network of Irish non-governmental environmental organisations - www.ien.ie

Irish Peatland Conservation Council - www.ipcc.ie

Irish Wildlife Trust – www.iwt.ie

Irish Seal Sanctuary – www.irishsealsanctuary.ie

Irish Seed Savers Association: Research, locate and preserve traditional varieties of fruit, vegetables and grains – www.irishseedsavers.ie

National Biodiversity Data Centre: Collects, manages and analyses data and information on Ireland's biodiversity – www.biodiversityireland.ie

National Parks and Wildlife Service: A statutory body responsible for the conservation of a range of habitats and species in Ireland – www.npws.ie

Notice Nature: A campaign to increase public awareness of the importance of Ireland's biodiversity – www.noticenature.ie

The Heritage Council: A statutory body who promote interest, education, knowledge and pride in our national heritage – www.heritagecouncil.ie

Swan: The Sustainable Water Network – www.swanireland.ie

noticenature
take action on biodiversity loss

Programmes

Millennium Ecosystem Assessment:
Researching the consequences of ecosystem change – www.millenniumassessment.org

TEEB Initiative: The Economics of Ecosystems and Biodiversity- www.teebweb.org

Further Reading

The Economic and Social Aspects of Biodiversity: 'Benefits and Costs of Biodiversity in Ireland'. A Report by the Department of Environment, Heritage & Local Government, 2008.

United Nations Environment Programme (2009): 'The Natural Fix – The role of Ecosystems in Climate Mitigation', UNEP.