

A Guide to

Nature Positive Dairy Farming



Contents

Introduction	4
A nature positive Northern Ireland by 2030	4
Case studies	6
Brady Farm, Co. Fermanagh	6
McConnell Farm, Co. Tyrone	8
Brown Farm, Co. Down	12
Jackson Farm, Co. Down	16
Taylor Farm, Co. Antrim	20
Ways to improve your farm for wildlife	24
Maintain and improve existing habitats or create new ones	24
Maintain and create ditches	25
Create flower and seed-rich habitats	25
Maintain or create high-quality hedgerows	26
Ensure wildlife corridors are in place	27
Implement good grassland management	28
Conservation grazing	29
Rotational grazing	29
Deferred grazing	30
Low-input grassland	30
Multi-species swards	31
Implement and use whole-farm soil analysis	31
Clover in pasture	32
Optimise slurry application	33
Implement buffer strips to protect watercourses	34
Avoid application of nutrients to areas of high-water flow	34
Use integrated pest and weed management	35
Use integrated parasite management	36
Create wet features	37
Use constructed wetlands to collect and treat dirty water	37
Agroforestry	38
Arable/wholecrop	39
Additional nesting opportunities	39



Taking even small steps to make space for nature can reap huge rewards.

Introduction

This booklet is based on work commissioned by RSPB Northern Ireland and the Dairy Council for Northern Ireland and delivered by Birnie Consultancy. It outlines the nature positive actions that can be practically implemented to enhance nature on commercial dairy farms.

In section one, we discuss 'nature positive' in the context of farming and land management. In section two, we profile five commercial dairy farms in Northern Ireland. A habitat assessment which was conducted on each farm is showcased, followed by an overview of opportunities for enhancing nature on each of the farms. Section three provides a menu of options for nature positive dairy farming.

A nature positive Northern Ireland by 2030

By 2030 the UK will be nature positive, meaning that nature will be in better health by the end of the decade than it was at the start, with declines reversed and nature recovering. Our farmed landscapes will be agriculturally productive but also bursting with nature, with farmers using resources optimally, whilst also playing a key role in reducing greenhouse gas emissions and storing carbon. This may sound overly hopeful, but it is in fact an ideal which is within our gift.

With 76% of Northern Irish land managed for agriculture, farmers have an important role to play in delivering nature positive by 2030. Every dairy farm has habitat which is worth preserving. In many cases, it is relatively easy to expand this habitat and it is important that all farmers play their part in trying to make space for nature on their farm. There are over 3,000 dairy farmers in Northern Ireland who can have a substantial impact in delivering change, and with the right management practices, achieve

the best balance of production, resilience and nature. Many of the factors which have a positive impact on productivity or profit also deliver environmental benefits.

Many farmers and land managers are already actively driving this transition with many pursuing approaches that are helping nature rebound, contributing to climate change goals, producing great food, and providing better business and wellbeing outcomes for themselves. But farming needs help and now at a time of great change, we have the opportunity to put in place positive changes to food and farming which deliver for farmers, nature and wider society.

Nature needs dedicated space to thrive, but also requires sympathetic farming practices which allow a diverse range of species to co-exist in the farmed landscape. Increasingly, farms are being required (by government and the marketplace) to demonstrate high

performance in this area, with regulation, farm support packages, and market requirements all combining to influence on-farm activity. By considering nature and taking even small steps to create space and manage land in a more sustainable way, farmers can have a huge impact.

We know from our survey work in preparing this Guide that many Northern Ireland farmers already take great pride in their role as custodians of the countryside. The practical options outlined will be a useful tool for farmers and their advisers to help inform positive habitat management practices that deliver win-win outcomes for both farming and biodiversity.

Farm surveys, habitat assessment and opportunity mapping

The following section highlights opportunities for enhancing nature on five commercial dairy farms in Northern Ireland. Farms were chosen to reflect different dairy systems, namely: fully housed, partially grazed and seven month grazing. Farms were also geographically spread across Northern Ireland to reflect differing climatic conditions.



Figure 1. Location of dairy farms surveyed



Cethin Davies

Cows in herbal ley.

Case study

Brady Farm, Co. Fermanagh

The Brady's farm is situated in west Fermanagh, on the shores of Lower Lough Macnean. The area of the farm surveyed was 118 hectares in three blocks, most of which is set-out in improved grassland, dominated by Ryegrass (*Lolium perenne*).

The Bradys have a productive herd of 120 Holstein cows producing 9,900 litres on zero grazing. Average meal fed is 2.5 tonnes and three cuts of silage are taken per year. The Bradys also run a beef and sheep system, taking cattle to mainly stores, while most lambs are sold as fat.

Existing farm habitats

Infield vegetation

The farm is dominated by Ryegrass swards. Fields that are used for young stock or are difficult to cultivate are managed less intensively and have a mixture of grasses and herbs with a higher percentage of Yorkshire Fog (*Holcus lanatus*) and meadow grasses (*Poa spp.*). The farm has a significant number of linear habitats in the form of hedgerows, woodland, riparian and lacustrine edge habitats.

Hedgerows

The hedgerows on the farm range from high potential biodiversity to limited plant diversity. Overall the linear length of existing hedges on the farm was measured as 9.4km.

While there are many hedgerow trees in the farm they are dominated by Ash (*Fraxinus excelsior*), followed by Sycamore (*Acer pseudoplatanus*). Some of the Ash appear to be suffering from Ash Dieback (*Hymenoscyphus fraxineus*).

The hedgerow understory flora has potential, with woodland ground flora under some hedges. This should be encouraged. However, the grazing of the fields with sheep will make this difficult to fulfil as they will eat these flowering species.

Riparian woodland

A significant length of native riparian woodland of approximately 700m exists along the Cladagh river, to the eastern side of the main farm.

Non-linear habitats

Woodland and marginal vegetation

The farm has a significant area of wet 'carr' woodland (circa 10 hectares) on the shores of Lough Macnean. This woodland is dominated by willow (*Salix spp.*). There is a small area of open woodland on the farm.

There is also a significant area of marginal vegetation (2.2 hectares), dominated by Reed Canary Grass (*Phalaris arundinacea*) on the edge of the lough.

Other habitats

The farm buildings offer some habitat potential for species such as Starlings and House Sparrows.

Biodiversity improvement opportunities

There are significant opportunities for biodiversity enhancement on the farm. This includes improvements to the structure and diversity of existing habitats, creating connectivity between similar habitats, and creating new habitats.

Increasing the number, and improving the condition, of hedgerows

The existing hedges on the farm provide significant opportunities for biodiversity enhancement, mainly through creating diverse layers (platforms) within the hedge system.

Improving the quantity and functional quality of hedgerows is best achieved by letting them reach at least 2m in width and allowing them to grow in a more natural form, with a mixture of levels. Hedges should be allowed to grow to at least 3m high. By increasing the width and height of hedges we significantly increase both the green surface area of the hedge but also the volume of the hedge that is available to wildlife.

Addition of new hedgerows and native tree lines

The addition of new hedge features offers a significant opportunity to improve habitat. It is suggested that these new features should be at least 2m wide, with diverse planting and with hedgerow trees 20m apart. They also, in the long term, should be managed to increase on-farm shelter and to maximise biodiversity potential.

New native riparian planting of trees at one per 2m over 419m needs 210 trees, with a further proposal of coppicing and interplanting hedges requiring 1,500 hedge plants and 15 trees. These features are highly important habitats in their own right, but will also have a synergistic effect of connecting existing hedges and woodland areas adjacent to the fields.

Addition of a traditional orchard

Orchards are a mosaic habitat. They contain elements of woodland, pasture and meadow

grassland, and are often bordered by hedgerows. These individual habitats combine in your orchard to create many niches for insects, amphibians, birds and mammals.

The incorporation of a small orchard on the farm will certainly provide an interesting habitat, as well as providing fruit for the farm families. The orchard is small at 0.08 hectares, but nevertheless is a useful biodiversity addition.

Multi-species swards

The Bradys are willing to try these swards on an area that is grazed and from which they currently harvest hay. It is recommended that they start with one field as a learning trial. This field should be tightly grazed or cut before planting and then heavily disked, followed by over sowing and rolling (roll along and then across the field if possible to increase seed to soil contact).

Grassland management for birds in winter

The farm is used by wintering wading birds and by a range of wildfowl species. Areas on the west side of the farm have not been recommended for hedgerow restoration, as these open fields close to the lake are important in attracting these ground-feeding species. It is recommended that these fields are left with a fairly short sward in autumn so that the sightlines of feeding birds are not blocked and that a leafy sward develops into early winter.

Introducing nest boxes

There are several areas on the farm that lend themselves to artificial nesting, indeed the Bradys have already fitted a Barn Owl nest box in the hope of attracting this species.

Case study

McConnell Farm, Co. Tyrone

McConnell's farm is situated between Omagh, Newtownstewart and Gortin. The farm area studied contains approximately 66 hectares in two blocks, most of which is set-out in improved grassland, dominated by Ryegrass (*Lolium perenne*) with some areas of wet heath/acid grassland. To improve fodder quality Drew grows whole-crop. The field is then resown with a Ryegrass/clover mix and the process is repeated in another older pasture.

The McConnell's dairy unit is a fairly intensive hybrid system, in which the McConnells milk 160 Holstein cows, 50 by robot and 110 in the parlour. The cows average approximately 9,900 litres per lactation.

They also have 20 suckler cows and raise a further 20 dairy cross beef calves. Replacements are bred with a focus on efficiency, selecting for long lifespan animals with high milk production but low maintenance and environmental cost.

Existing farm habitats

Infield vegetation

The farm is dominated by Ryegrass swards, with usually one field in arable rotation. Drew usually re-seeds the farm with a standard grazing mix which contains a range of Ryegrass and White Clover (*Trifolium repens*) cultivars.

High nature-value habitats

There are a range of high-nature-value habitats on the farm. These range from naturally regenerating woodland of mainly Birch (*Betula spp.*) and Willow (*Salix spp.*), to small planted native woodland corners of less than 15 years old, as well wet heath/acid grassland with scrub. The area of woodland is approximately 0.95 hectares comprised of one area of regenerated woodland and a number of small planted woodland sites in field corners. The area of high-nature-value grassland/heath habitats is 12.4 hectares.

Linear habitats

The farm has a significant number of linear habitats in the form of hedgerows, ditches

(hedgebanks) and a stream. All these habitats have significant biodiversity potential.

Hedgerows

The hedgerows on the farm vary in management type and diversity. Overall the linear length of existing hedges on the farm was approximately 16.6km.

Most of the hedges have been allowed to grow up to create tall thick hedges with a wide variety of species. This creates a woodland edge habitat which is particularly good for a wide range of biodiversity. A significant number of these habitats are along hedges but in most instances still contain a wide variety of species.

Stream

There is a stream running through a significant part of the farm, which is a tributary of an important Salmon river (River Strule).

Other habitats

Farm buildings

The farm buildings offer habitat for Feral Pigeons, House Sparrows and Starlings (and Swallows in summer), which use the farm for nesting and/or feeding.

Disused buildings

Some of the older disused buildings on the farm hold old passerine nests (likely Robin and Wren).



Casual wildlife observations



Birds

Bird species casually observed during the survey included Great Tit, Blue Tit, Robin, Goldfinch, Chaffinch, Dunnock, Wren, Blackbird, Starling, House Sparrow, Rook and Jackdaw. Snipe, Meadow Pipit and Skylark

Biodiversity improvement opportunities

Increasing the number, and improving the condition, of hedgerows

In the main, the existing hedges are in excellent condition for wildlife, but there are still opportunities for biodiversity enhancement. This improvement would be mainly through adding some new layers (platforms) within the hedge system and increasing the height and width of some 'over-managed' hedges. In essence a hedgerow managed for biodiversity mimics a woodland edge habitat. Adding new hedges will increase the length of this habitat by 1,561m, and increasing the size and width of 3,192m of hedge. As a result, there will be a marked increase in this habitat and its connectivity to other hedges and woodland areas. Ideally, hedges around the farm should be cut on rotation, with each area cut only once every three years.

Addition of trees to hedges

The addition of trees within existing hedges helps to create a canopy layer within the system. The addition of trees can be through the planting of guarded trees of the size 120cm+ every 20m along the hedge.

Addition of new hedgerows, hedgerow repair activities and native tree lines

The addition of new hedges offers a significant opportunity to improve habitat. It is suggested that these new features should be at least 2m wide, with diverse planting and with hedgerow trees, 20m apart. In the long term, they should be managed to increase on-farm shelter and to maximise biodiversity potential.

New ground flora enrichment below hedges

One biodiversity aspect that is often overlooked in farmland diversity programmes is the importance of the ground layer, which is a vital element in hedge habitat.

McConnell's Farm has a reasonably diverse hedge ground flora, but could benefit greatly from the addition of key species in some areas. These areas offer great potential to add perennial woodland edge ground flora, that will add significantly to pollinator habitat and provide seeds for small birds and mammals. The area in question is 215m long.

Species recommended for perennial planting are: easy to pre-propagate; suitable for the habitat; robust and competitive; and provide spring and summer flowers for pollinators and seeds for birds and mammals. They include:

- Primrose (*Primula vulgaris*)
- Red Campion (*Silene dioica*)
- Lesser Knapweed (*Centaurea nigra*)
- Wild Garlic/Ramsons (*Allium ursinum*)
- Bluebell (*Hyacinthoides non-scripta*)
- Wood Cranesbill (*Geranium sylvaticum*) (priority species, grown under licence)
- Meadow Cranesbill (*Geranium pratense*)

The farm also has small areas of fenced-off planted woodland, which have now reached a closed canopy stage. Planting these areas (which comprise approximately 0.2 hectares) with woodland ground flora, such as native Bluebells, Primroses or Wood Anemones, will also create a further area of spring flowers. These are an important resource for pollinators in the spring.

New woodland

The farm contains a few opportunities for native woodland creation. These are agriculturally marginal areas the McConnells are interested in planting. These small areas will further add to the woodland and woodland edge complex that runs through the farm. The area proposed is 0.46 hectares, comprising three small areas.

Creation of new ponds

There is one area on the farm where small ponds could be created. The McConnells would like to create a larger pond for wildfowl and wading birds to use. However, it has also been suggested that two smaller ponds be created.

Small, shallow ponds provide useful habitat for species such as frogs and newts that might be more easily predated in larger, more open ponds. The mixture of larger and two smaller ponds will create a wider range of ecological niches. In relation to the biomass of amphibians and insects produced from these ponds they also provide an important extra food source to species further up the food chain.

Shallow edges around ponds also provide high-quality feeding habitat in the form of invertebrates for young wading birds. As Snipe have already been observed on the farm it is likely that this will further add to the attractiveness of this site for these and potentially other birds.

The total area of ponds is 0.8 hectares, which is likely to contribute greatly to biodiversity, especially as it lies within a semi-natural acid grassland, which is already of high biodiversity potential.



Ben Andrew (rspb-images.com)

Native flowers, such as Bluebells, are a vital food source for pollinators in spring.



Frogs and newts will benefit from small, shallow ponds, where they are safer from predators.

Case study

Brown Farm, Co. Down

James Brown's farm is situated between Newtownards and Donaghadee. It contains approximately 47 hectares in two blocks, most of which is set-out in improved grassland, dominated by Ryegrass (*Lolium perenne*). As part of his re-seeding strategy, James rents out a field as conacre for Spring Barley. The field is then resown with a fairly standard Ryegrass/clover mix and the process is repeated in another older pasture.

James' unit is a seven-month grazing dairy unit with a September to April calving period. Milking 80 British Friesian cross cows, James is continuing to select towards a British Friesian cow. James has an average production of 7,500 litres per cow, per lactation.

James uses a Hereford Bull and raises his beef calves to circa 10 months, when they are sold mainly as stores. Most milk cow replacements are bred on the farm using sexed semen from British Friesian AI bulls, but some replacements are also occasionally bought-in.

Existing farm habitats

Infield vegetation

The farm is dominated by Ryegrass swards, with usually one field in arable rotation. James usually re-seeds the farm with a standard grazing mix, which contains a range of Ryegrass and White Clover (*Trifolium repens*) cultivars. Clover is a welcome production species within the mix, as it is leguminous, high in protein and palatable. White Clover is also important for pollinator species and is used by a wide range of insects. It is also eaten by a range of other wildlife, including Woodpigeons and Wood Mice. However, the clover is usually removed from the sward when James sprays to control docks (*Rumex spp.*).

Linear habitats

The farm has a significant number of linear habitats in the form of hedgerows, a stream and a small area of stone wall. All these habitats have biodiversity potential.

Hedgerows

The hedgerows on the farm vary in management type and diversity. Overall the linear length of existing hedges on the farm is approximately 8.3km.

Many of the hedges are tightly cut into small boxes of little more than 1.5m in height. The length of hedge being managed in this way is almost 3,000m.

A significant number of the hedges on the farm are limited to a few species and are dominated by Whitethorn (*Crataegus monogyna*). The linear length of these hedges is over 4,000m.

Dry stone wall

The wall area is primarily a south-west facing corner, which has opportunities for insect sunbathing and contains a large number of crevices which could be used by mammals, birds and insects.

Sheugh/stream

There is a sheugh/stream running through a significant part of the farm. Visually the water quality appears to be good with the main aquatic plant species being Starwort (*Callitriche stagnalis*). This waterway is piped over part of its length.

Other habitats

The farm buildings offer some habitat for species, with Starlings and House Sparrows being observed using the site for nesting.

Casual wildlife observations



Mammals

The farm has a several Badger setts, most likely from the same clan group.



Birds

Bird species casually observed included Great Tit, Blue Tit, Robin, Goldfinch, Chaffinch, Dunnock, Wren, Blackbird, Starling, House Sparrow, Rook and Jackdaw.



Amphibians

A Common Frog was observed on the edge of a sheugh during the study.

Biodiversity improvement opportunities

There are significant opportunities for biodiversity enhancement on the farm. This includes improvements to the structure and diversity of existing habitats, creating connectivity between similar habitats, and creating new habitat.

Increasing the number, and improving the condition, of hedgerows

The existing hedgerows on the farm provide opportunities for biodiversity enhancement; this is mainly through creating diverse layers within the hedge system. In essence, a hedgerow managed for biodiversity mimics a woodland edge habitat and benefits livestock in terms of shelter and biosecurity. Woodland edges are transitional areas where forests meet open habitats, such as fields. These transitional zones often have a distinct mix of vegetation reflecting both woodland and open habitat. This, in turn, provides a variety of resources and ecological niches for a wide variety of different animal species.

Improving the quantity and functional quality of hedgerows is best achieved by letting them reach at least 2m in width and allowing them to grow

in a more natural form, with a mixture of levels. Hedgerows should be allowed to grow to at least 2m high but, preferably higher (3m+). By increasing the width and height of hedgerows we significantly increase both the green surface area of the hedge but also the volume of the hedge which is available to wildlife.

Addition of trees to hedgerows

The addition of trees within existing hedgerows helps to create a canopy layer within the system. The addition of trees can be through the planting of guarded trees of the size 120cm+ every 20m along the hedge. However in some instances tree species are already within the hedge and are constantly cut and not allowed to grow. Simple identification and avoidance during cutting would allow the trees to emerge. The addition of trees to the hedge is proposed every 20m. Along a stretch of 3,714m it is

suggested that an addition of 185 trees would significantly increase biodiversity.

Hedgerow enrichment

A significant amount of hedgerow on the farm is species poor (4,195m) and consists almost entirely of hawthorn. To add more diversity to the hedgerow it is suggested that a new hedge plant be put in every 10m, which is 420 shrubs.

Addition of new hedgerows, hedgerow repair activities and native tree lines

The addition of new hedge features offers a significant opportunity to improve habitat. It is suggested that these new features should be at least 2m wide, with diverse planting and with hedgerow trees, 20m apart. They also, in the long term, should be managed to increase on-farm shelter and to maximise biodiversity potential. The total linear length of new hedge proposed on the farm is circa 1,490m of traditional 2m+ wide hedge, 204m of a 3m wide Pontbren Hedge, over 800m of coppice interplant hedges and a further 220m of new native tree lines.

New ground flora enrichment below hedges

One biodiversity aspect that is often overlooked in farmland diversity programmes is the importance of the ground layer. Often in grazing systems, the ground flora layer below and beside hedges gets grazed out. Therefore, it is often the case that an important element of the hedgerow/ woodland edge habitats is missing. James Brown's farm offers an opportunity to enrich areas that are not grazed. These areas offer great potential to add perennial woodland edge ground flora, that will add significantly to pollinator habitat and provide seeds for small birds and mammals.

Creation of new ponds and woodland

There are two areas on the farm that have been identified as possibilities to create small ponds. Small, still ponds like this have very important potential for wildlife, as they create much-needed habitat for a wide range of species including amphibians, insects, birds and mammals. In relation to the biomass of

amphibians and insects produced from these ponds they also provide an important extra food source to species further up the food chain. The total area of ponds proposed is 42m².

Multi-species swards

There is scientific evidence that dairy cows grazing on multi-species swards produce more milk with an increase in dairy fats. Also, the management of these swards lends itself well to a rotational grazing pattern that is typical of most grazing dairy systems.

Multi-species swards, especially with clover and Lucerne (*Medicago sativa*), fix nitrogen from the air and can reduce the need for nitrogen fertiliser. Plants like Ribwort Plantain (*Plantago lanceolata*), Yarrow (*Achillea millefolium*) and Chicory (*Cichorium intybus*) have anti-parasitic properties, while their deep root systems can not only 'mine' minerals from deep in the soil, but also increase the carbon content, structure and water balance of soils. These plants are also drought tolerant, which is becoming increasingly important in grazing systems.

Multi-species leys also have many useful properties in terms of improving soil biology and providing food for insects and especially pollinators.

Additional nesting opportunities

Many natural nesting sites, like holes in trees, depend on mature woodland that is usually not found on farms. Provision of these habitats can have a huge impact for species which may be limited by nesting opportunities.



Ponds provide habitat for insects, which in turn provide food for birds, mammals and other animals.

Case study

Jackson Farm, Co. Down

Stephen Jackson's farm is situated close to Bangor in County Down. The area of the farm surveyed was 88 hectares in three blocks, most of which is set-out in improved grassland, dominated by Ryegrass (*Lolium perenne*).

Stephen's unit is a zero grazing silage unit with some 250 Holstein cows. He uses genetic selection to produce a medium-sized, well-fleshed cow with a very high milk output of 11,000 litres (37 litres per day) with high protein and butterfat. Stephen also selects beef straws of high genetic merit for a quality calf that is sold into the beef sector. All replacement cows are home bred from the cows with the highest genetic merit, using sexed semen from a range of dairy bulls with the right genetic fit for each cow's requirements. Stephen feeds an average of 3.2 tonnes of meal per animal per annum.

Milking cows are put to pasture in the last phase of their lactation and while dry (weather dependent). The farm soils are heavy, but productive with four to five cuts of silage per season. Slurry is applied with dribble bar. Due to the frequency of cutting, slurry straplines across the field are a concern for Stephen, which impacts on silage quality. Stephen is part of a trial experimenting with a solids extractor to make the slurry more usable and to reduce phosphorus and potassium, which are removed with solids.

Existing farm habitats

Infield vegetation

The farm is dominated by old, predominantly Ryegrass swards. Much of the most productive land has not been re-seeded in decades, although it still produces a high quality sward. Some of the swards that are used for young stock are managed less intensively and have a high percentage of Yorkshire Fog (*Holcus lanatus*).

Linear habitats

The farm has a significant number of linear habitats in the form of hedgerows.

Hedgerows

The hedgerows on the farm are mostly of poor biodiversity quality and limited plant diversity. Overall the linear length of existing hedges on the farm is approximately 4.8km. The majority

of the hedges are tightly cut into small boxes between 1 to 1.5m wide and 2m in height.

While there are hedgerow trees on the farm, these are limited and where they do exist they are dominated by Ash (*Fraxinus excelsior*), followed by Sycamore (*Acer pseudoplatanus*). Some of the Ash appear to be suffering from Ash Dieback (*Hymenoscyphus fraxineus*).

Woodland

While the home farm is surrounded by mature woodland on two sides, this farm has few trees. Both out-farms have mature woodland boarding them, but one of these farms has woodland and parkland that is within the farm area and in some instances is used by the cattle.

Other habitats

The farm buildings offer some habitat potential for species. Swallows were observed using the site for nesting.

Casual wildlife observations



Birds

Bird species casually observed included Great Spotted Woodpecker, Great Tit, Robin, Dunnock, Wren, Blackbird, Starling, Rook, Carrion Crow and Jackdaw.

Biodiversity improvement opportunities

There are significant opportunities for biodiversity enhancement on the farm. These include improvements to the structure and diversity of existing habitats, which will create connectivity between similar habitats. There are also opportunities for habitat creation.

Increasing the number, and improving the condition, of hedgerows

The existing hedges on the farm provide significant opportunities for biodiversity enhancement. This is mainly through creating diverse layers (platforms) within the hedge system. In essence a hedgerow managed for biodiversity mimics a woodland edge habitat. Woodland edges are transitional areas where forests meet open habitats, such as fields. These transitional zones often have a distinct mix of vegetation reflecting both woodland and open habitat. This, in turn, provides a variety of resources and ecological niches for a wide variety of different animal species.

Improving the quantity and functional quality of hedgerows is best achieved by letting them reach at least 2m in width and allowing them to grow in a more natural form, with a mixture of levels. Hedges should be allowed to grow to at least 3m.

By increasing the width and height of hedges we significantly increase both the green surface area of the hedge but also the volume of the hedge which is available to wildlife.

Addition of trees to hedges

The addition of trees within existing hedges helps to create a canopy layer within the system. The addition of trees can be through the planting of guarded trees of the size 120cm+ every 20m along the hedge. Along a stretch of 2,805m it is suggested that the addition of 134 trees would significantly increase biodiversity.

Addition of new hedgerows and native tree lines

The addition of new hedge features offers a significant opportunity to improve habitat. It is suggested that these new features should be at least 2m wide, with diverse planting and with hedgerow trees, 20m apart. They also, in the long term, should be managed to increase on-farm shelter and to maximise biodiversity potential. The total linear length of new hedge proposed on the farm is circa 1,965m of traditional 2m+ wide hedge, 174 new native tree lines to create 3m wide Pontbren Hedges, over 800m of coppice interplant hedges and a further 220m of new native tree lines. These features are highly important habitats in their own right, but will also have a synergistic effect of connecting existing hedges and woodland areas adjacent to the fields.

New ground flora enrichment below hedges

One biodiversity aspect that is often overlooked in farmland diversity programmes is the importance of the ground layer. Therefore, it is often the case that an important element of the hedgerow/woodland edge habitats is missing. Stephen's farm offers some potential for this along 1,240m of hedge which lies along a lane and in two sections with the field. These areas offer great potential to add perennial woodland edge ground flora, that will add significantly to pollinator habitat and provide seeds for small birds and mammals. The area in question is 1,315m long.

Creation of new ponds and woodland

There are two areas on the farm where it is possible to create small ponds. Small, still ponds like this have very important potential for wildlife, as they create much-needed habitat for a wide range of species including amphibians, insects, birds and mammals. In addition to the biomass of amphibians and insects produced from these ponds they also provide an important extra food source to species further up the food chain. While the total area of both ponds is only 0.03 hectares, their impact is likely to contribute greatly to farm biodiversity.

Small ponds are vulnerable to nutrient enrichment on farms and so they should be buffered from fertiliser leaching and animal waste input using habitat strips and fencing. Maintenance is also important.

The creation of small areas of woodland (0.02 hectares) also adds to the overall diversity. This area will increase the biodiversity of the pond on the home farm by linking with hedges and, as it is close to the proposed new pond, will add greater diversity. Note that care should be taken to plant the small woodland to the north of the pond so that necessary light is not blocked from the water. It is recommended that this woodland is comprised of species such as Birch, Mountain

Ash and Hazel. These species are relatively small and should not over shadow the pond. These areas also help connect to a larger area of open woodland on an adjacent neighbour's farm.

New parkland trees

There is a significant area of parkland on one of the outlier farms. Given that parkland generally does not regenerate, strategic planting of guarded native trees should be considered before these mature trees decline. It is recommended that these species are large, such as oak and Scots Pine (*Pinus sylvestris*). If non-natives are used, as is the tradition in many parklands, high nature value species such as Beech (*Fagus sylvatica*) and Norway Maple (*Acer platanoides*) should be used.

Multi-species swards

Stephen is willing to try these systems on the four fields that are grazed by young stock. It is recommended to start with one field as a learning trial. This field should be tightly grazed or cut before planting and then heavily disked, followed by over sowing and rolling (roll along and then across the field if possible to increase soil seed contact).

Native meadow creation/management

There is a field on Out-farm A that currently offers grazing for young stock. This field has a range of native meadow species within it and could be easily managed as a grazed meadow.

Species-rich meadows have declined by over 95% in the last 80 years. Wildflower meadows are extremely diverse habitats, with a huge variety of flowers that are ideal for bees, hoverflies, moths and a wide range of other wildlife. By changing the grazing regime of this field and ensuring that it receives no fertiliser, this meadow is likely to further improve for nature.

Multi-species leys also have many useful properties in terms of improving soil biology and providing food for insects and especially pollinators.

The management of this meadow involves delayed grazing until August and grazing fairly heavily during the autumn period.

Invasive species removal

The home farm has a clump of Japanese Knotweed (*Fallopia japonica*) just outside the farm fence. It appears that this plant has been treated at some stage but would benefit from removal. The most effective way to kill this species (when not adjacent to water) is the use of glyphosate, during its leafy stage, when it is approximately 1m high. Regrowth should be treated in the same way until the plant is dead.

There is a significant amount of invasive Cherry Laurel (*Prunus laurocerasus*) and Rhododendron (*Rhododendron ponticum*) at Out-farm A. However this lies outside the land under Stephen's control.

Skunk Cabbage (*Symplocarpus foetidus*) was also found. This is a wetland species and it is potentially invasive. As numbers are low, the best removal method at this stage is probably digging out. Plants, new seedlings and rhizomes can be dug out and removed from site for disposal. However, monitoring the site after removal is important in case fragments of rhizome remain, as these fragments can regenerate and form new plants.

Additional nesting opportunities

Many natural nesting sites, like holes in trees, depend on mature woodland that is usually not found on farms. Provision of these habitats can have a huge impact for species which may be limited by nesting opportunities. There are several areas on the farm that lend themselves to artificial nesting boxes.



Ben Andrew (rspb-images.com)

Trees provide natural nesting and feeding sites for a range of species.

Case study

Taylor Farm, Co. Antrim

The Taylor's farm is situated close to Portrush. It contains 175.3 hectares of fields as well as farm yards. The land assessed was in three main blocks most of which is set out in grassland pasture dominated by Rye Grass (*Lolium perenne*) with some areas, used for beef where Yorkshire Fog (*Holcus lanatus*) formed a larger percentage of the pasture.

The Taylors unit comprises a Spring calving unit with New Zealand Friesian, Jersey cows, producing 6,500 litres per year. Heifers are raised as replacements and all other calves are raised as beef stock, which are taken to finish.

Milking cows are put to pasture for as long as weather allows.

Existing farm habitats

Infield vegetation

The farm is dominated by Ryegrass swards, however, red clover is now used in silage (circa 13 hectares) and herbal leys (circa 9.6 hectares) in his grazing platforms.

Some of the swards that are used for young stock and beef are managed less intensively and have a higher percentage of Yorkshire Fog (*Holcus lanatus*).

Linear habitats

The farm has significant number of linear habitats in the form of hedgerows and a sheugh/stream.

Hedgerows

The hedgerows on the farm are largely of poor biodiversity quality and limited plant diversity. Overall the linear length of existing hedges on the farm was approx. 23 kilometres.

The majority of the hedges are tightly cut into small boxes between 1 to 1.5 metres wide and less than 2 metres in height.

While there are hedgerow trees on the farm, these are very limited and where they do exist

they are dominated by Ash (*Fraxinus excelsior*), followed by Sycamore (*Acer pseudoplatanus*). Some of the Ash appeared to be suffering from Ash Dieback (*Hymenoscyphus fraxineus*).

The hedgerow understory flora was very limited across the farm.

Sheugh/Stream

There is a sheugh / stream running through the farm, which is partially culverted. This sheugh is a source for a range of aquatic plants which provide diversity of habitat across the farm.

Woodland

There is approximately 4 hectares of woodland on the farm divided into small areas. These woodland areas are largely broadleaved with poor ground story layer.

Other Habitats

The farm buildings offer some habitat potential. Like many dairy farm buildings that store animal feed, there are large numbers of Starlings. The farm buildings also have house sparrow and swallow nesting.

Casual wildlife observations



Birds

Bird species casually observed included Great Tit, Robin, Dunnock, Wren, Blackbird, Starling, Rook, Yellow Hammer (Red List Species), Wood Pigeon, House Martin and Collared Dove

Biodiversity improvement opportunities

There are significant opportunities for biodiversity enhancement on the farm. This includes improvement of structure and diversity of existing habitats, which creates connectivity between similar habitats as well as creating new habitat.

Increasing the number, and improving the condition, of hedgerows

The total linear length of new hedge proposed on the farm is circa 3339 metres of traditional 2+ metre wide hedge, 1447 metres new native tree lines (150 trees) and 852 metres of 3 metre wide Pontbren Hedges. In addition, there is 876 metres hedge repair and infill recommended using coppice / interplanting. These features are important habitats in their own right but will also have a synergistic effect of connecting existing hedges and woodland areas adjacent to the fields.

Improving the quantity and functional quality of hedgerows is best achieved by letting them reach at least 2 metres in width and allowing them to grow in a more natural form, with a mixture of levels. Hedges should be allowed to grow to at least 3+ metres. Hedges on the farm are regularly cut and are, for the most part, less than 2 metres in height and less than 2 metres wide. Increasing the width and height of the hedge, will enhance biosecurity, improve shelter for livestock and contribute to a more varied diet for cattle in the form of browse. Roots of mature hedges also contribute soil health and water balancing of soils.

Addition of trees to hedges

The addition of trees within existing hedges helps to create a canopy layer. The addition of trees can be through the planting of guarded trees of the size 120cm+ every twenty metres

along the hedge. The addition of trees to the hedge is proposed every 20 metres.

Along a 18,600 metres it is suggested that an addition of 940 trees would significantly increase biodiversity.

Tree species suggested should be varied and could include:

- Common Alder (*Alnus glutinosa*)
- Downy Birch (*Betula pubescens*)
- Spindle (*Euonymus europaeus*)
- Rowan (*Sorbus aucuparia*)
- Wild Cherry (*Prunus avium*)
- Bird Cherry (*Prunus padus*)
- Sessile Oak (*Quercus petraea*)
- Common Oak (*Quercus robur*)

Hedgerow enrichment

These species have good browse potential, high protein and micronutrient content which is good for bovine health.

A significant length of hedgerow on the farm (18,600m) was species poor. To add more diversity to the hedgerow it is suggested that a new hedge plant be inserted every 10 metres, which amounts to approximately 1900 shrubs. These could include a mixture of each species, suggested below:

- Hazel (*Corylus avellana*)
- Spindle (*Euonymus europaeus*)
- Grey Willow (*Salix cinerea*)

- Blackthorn (*Prunus spinosa*)
- Holly (*Alex aquifolium*)
- Guelder Rose (*Viburnum opulus*)
- Elder (*Sambucus nigra*)
- Crab Apple (*Malus sylvestris*)
- Honey Suckle (*Lonicera periclymenum*)
- Blackthorn (*Prunus spinosa*)

A fodder hedge of circa 500 metres should also be planted. This will still have significant biodiversity potential, and could include species such as:

- Grey Willow (*Salix cineria*)
- Native Privet (*Ligustrum vulgare*)
- Oisier (*Salix Viminalis*)
- Alder (*Alnus Glutinosa*)
- Guelder Rose (*Viburnum opulus*)
- Downy Birch (*Betula pubescens*)

Creation of Woodland and understory planting into existing woodland

The proposed creation of small areas of woodland (2 hectares) also adds to the overall diversity. Linking the woodland through hedgerow systems creates 'wildlife corridors' by connecting 'woodland islands' throughout the farm. The addition of parkland trees in two small areas of the farm will add an upper layer to the biodiversity of the Whin (*Ulex europeus*) bushes in these areas.

There is one woodland that lends itself to creating under-planting with woodland floor species. Planting this area, comprising approximately 0.75 hectares, with woodland ground flora will also create an area of Spring flowers, which are an important pollinator resource. Species recommended in these areas include:

- Wild Garlic / Ramsons (*Allium ursinum*)
- Blue Bell (*Hyacinthoides non-scripta*)
- Wood Sorrel (*Oxalis acetosella*)
- Wood anemone (*Anemone nemorosa*)
- Herb Robert (*Geranium robertianum*)

Creation of new ponds and constructed wetlands

There are two areas on the farm that have been identified as possibilities to create small ponds and an artificial wetland (reed beds, open water and wet woodland), to filter potential wash from the farmyard.

Small still ponds have important wildlife potential by creating much needed habitat for a wide range of species including amphibians, insects, birds and mammals. The amphibians and insects produced from these ponds also provide an important extra food source for species further up the food chain.

New native meadow

Wildflower meadows are extremely diverse habitats, with a huge variety of flowers, ideal for bees, hoverflies and a wide range of other wildlife.

There are two areas on the main farm that currently offer grazing for young stock. These areas offer an opportunity to create native meadows. Native meadow already exists around the slurry lagoon and this area should also be extended. Locally sourced seed mix should be used or grasses such as Crested Dogtails (*Cynosurus cristatus*), Sweet Vernal Grass (*Anthoxanthum odoratum*), Meadow grasses (*Poa spp*) could be sown. Once established, adding locally sourced Yellow Rattle (*Rhinanthus minor*) is a key step, followed by a range of wildflower seeds, or plug plants. If required, sowing of locally sourced, Yellow Rattle seed and wildflower plugs will speed up this process.

Delayed grazing or cutting of these areas until mid-August will help provide a haven for nature. In the initial years, removal of robust invasive species (Nettle Docks and Thistle) will be required until the meadow soil biology establishes.

Multispecies swards

The farm has already embraced multispecies swards (MSS) in the form of herbal leys with a diverse range of productive grasses, herbs and legumes producing well-balanced forage across the season and fixing large amounts of nitrogen from the air. Some of the species used in herbal leys are deep-rooting and can unlock resources from the subsoil which are not accessible by the shallow-rooted grass-only systems. Well balanced species rich mixtures do not require high fertiliser inputs and should provide increased levels of minerals and vitamins to livestock. Also, if herbal leys are grown for approx. 5 years they will substantially improve the soil's natural fertility and improve soil drainage structure due to deep root action.

There is scientific evidence that dairy cows grazing on multispecies swards produce more milk with an increase in dairy fats. Also, the management of these swards lends itself well

to a rotational grazing pattern that is typical of most grazing dairy systems. These plants are also drought tolerant, which is becoming increasingly more important in grazing systems.

Herbal leys are also pollinator friendly, and support large and diverse fungi, bacteria, and invertebrate populations in the soil.

There is scope to expand MSS's in other fields across the farm.

Additional nesting opportunities

Many natural nesting sites, like holes in trees, depend on mature woodland that is often not found on farms. Provision of these habitats can have a huge impact for species which may be limited by nesting opportunities. There are several areas on the farm that lend themselves to artificial nesting boxes.



Reamni Mathers

Wooded areas can work well for grazing of young stock.

Making your farm more wildlife-friendly will not only benefit nature but livestock too.

Ways to improve your farm for wildlife

There are many ways to boost the wildlife value of your farm. On the following pages we present different options that can be mixed and matched depending on your circumstances.



Andy Hay (rspb-images.com)

Maintain and improve existing habitats or create new ones

All farms have habitat which is beneficial for nature, and protecting and enhancing this habitat is often the most effective way of improving a farm's biodiversity performance.

Identifying the habitat which is present on your farm is important, as well as identifying other areas (such as field corners or damp patches of land) which could be used to expand this habitat whilst making the farm easier to manage.

Improving existing habitat is one of the best ways of boosting your farm's biodiversity value.

Maintain and create ditches

Ditches are important to on-farm biodiversity, providing an important habitat for many aquatic plants, invertebrates and amphibians. They also play an important role in connecting habitats.

Wet ditches with densely vegetated banks are an important habitat for many species. Thanks to their shallow waters, which often lack significant fish populations, they provide ideal spawning areas for many amphibians, and egg-deposition sites for invertebrates, such as dragonflies and damselflies.



Cethin Davies

Wet ditches provide ideal spawning areas for amphibians.

Create flower and seed-rich habitats

Wildflowers provide pollinators with nesting sites and an important food source. The ideal location for flower- and seed-rich habitats is on improved arable sites and temporary grassland. The choice of site is important. Avoid planting under overhanging trees, next to tall hedges, in wet sites or on land facing north or east.

Wildflower planting does not usually permanently remove the ground from production, but some

areas could be permanently dedicated without a production impact, for example in silage fields where awkward field corners are usually left uncut following silage removal. These areas help to provide food and cover for a variety of species, such as farmland birds and small mammals, and could be grazed-off when animals are re-introduced to the field.



RSPB NI

Wildflowers and seeds provide food and cover for a range of pollinators, birds and small mammals.

Maintain or create high-quality hedgerows

A hedgerow is simply a boundary line of trees or shrubs over 20m long and less than 5m wide, where any gaps between the trees or shrub species are less than 20m wide. Any bank, wall, ditch or tree within 2m of the centre of the hedgerow is considered to be part of the hedgerow habitat, as is the vegetation within 2m of the centre of the hedgerow.

Good quality hedges that are high, dense and wide benefit livestock by providing shelter and shade. Highly variable weather conditions are a feature of Northern Ireland and hedges can help to alleviate the production impacts that can result.

Thick stock-proof hedges can also offer a barrier to the spread of disease by reducing animal-to-animal contact, which is the primary vector of disease transmission between livestock on neighbouring farms.

Other benefits of hedgerows include:

- slowing runoff
- increased soil water retention
- reduced soil erosion
- improved water quality
- the provision of habitat for wildlife
- increased carbon sequestration
- preservation of biodiversity
- flood risk reduction
- better protection for ecosystems
- vertical browse for livestock.

Completing gaps, allowing hedges to grow upwards and outwards, and the introduction of additional plant species all contribute significantly to the provision of habitat and raised biodiversity.



Ceithin Davies

Good-quality hedges can offer a barrier to the spread of disease by reducing contact between animals on neighbouring farms.



Gethin Davies

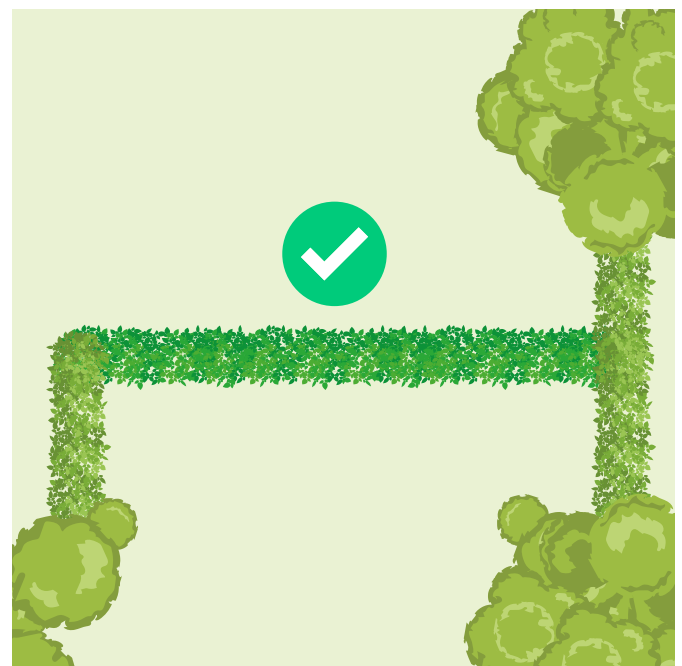
Ensure wildlife corridors are in place

A key component of a nature-friendly farm is the ability for wildlife to be able to safely move from habitat to habitat without having to take the risk of crossing open fields. A wildlife corridor is a strip of vegetation that connects two or more larger patches of vegetation and through which animals will likely move over time.

The diagram opposite shows how hedges can be used to join existing habitats either directly, or by linking to existing hedgerows already connected to existing habitats. Isolated areas of habitat within a farm like hedgerows, streams, forests and wildflower leys, whilst important, are essentially fragmented islands, limiting population growth and making it difficult for wildlife to move between available habitats.

This can prevent newly created habitats from being colonised or reduce a population's genetic diversity, as mating will be broadly limited to individuals within the habitat.

Steps can be taken on most dairy farms to join up habitats to ensure that wildlife has the ability to move safely throughout fields, along corridors. Again, these corridors can also have practical benefits on the farm, such as hedgerows providing stock-proof barriers and shelter.





Both overgrazing and undergrazing can damage habitats, so it's important to achieve a balance.

Implement good grassland management

Good grassland management is important to biodiversity, as overgrazing and undergrazing can damage habitats.

Undergrazing allows coarse grasses and scrub to grow, which will increase competition and shade, and can decrease the number of less competitive and less widespread species.

Overgrazing can stop plants from flowering, cause poaching, and reduce habitat variation. To prevent damage to habitats, grazing livestock should be carefully managed, adapting the approach taken to the type of habitat.

Continuous grazing within pastures managed to short sward heights cannot be tolerated by many plants, and as a result set stocking provides limited structural diversity or scope for plants to flower and set seed.

Grazing duration, grazing intensity, and the rest period between grazing, impacts profit drivers (pasture utilisation, quality and stock performance) and biodiversity drivers (sward structure diversity, flowering and the long-term pasture composition).

The mix of grass species on the farm influences both animal and biodiversity performance, and provides improved habitat for insects, which in turn provide additional food for insect predators.

Choosing the right mix of grasses and herbs for your farm and your grassland rotation is very important.

There are numerous grazing options available, as discussed in the following sections.

Conservation grazing

Conservation grazing is where grazing livestock are primarily used to manage the site for wildlife. It is acknowledged that this practice will not be suitable for certain dairy farms, and in particular for the management of the main production herd. However, some farms have areas of land which can be used in this way for the production of herd replacements, or to provide grazing for beef or sheep enterprises.

Conservation grazing can be an effective way to conserve and improve habitats by using traditional grazing methods in habitats such as grassland, heathland wood pasture, coastal and floodplain grazing marsh.



Traditional grazing methods can be used to manage areas for wildlife.



Rotational grazing increases the diversity of sward heights, creating more habitats for insects.

Rotational grazing

Rotational grazing has the potential to deliver biodiversity and production benefits. Rotations create diversity in sward heights between paddocks, creating more habitat for insects than in short, evenly grazed swards. However, fields grazed out evenly to 4–5cm to reset pasture quality leaves little within-field sward diversity.

Most dairy farms in Northern Ireland operate some form of rotational grazing and do have the potential to manage sward heights to some extent.



Andy Hay (rspb-images.com)

Deferred grazing allows plants to go to seed, providing food for wildlife.

Deferred grazing

It is possible for dairy farms to change the order in which fields are grazed, so that some fields can be left longer than others before being grazed or harvested for silage. In some management systems, deferred grazing is used to build up a stock of winter feed, but this is not really an option for all but a few farms in Northern Ireland. From a biodiversity perspective, the advantage of deferred grazing is that it allows Ryegrass and legumes to seed, providing food for various insect species. It also helps the persistence of plants within the sward.

The long-term changes to species diversity and the extent of the above benefits will depend on when pasture is deferred. For example, closing off in spring/summer during the plant reproductive phase will allow plants to flower and seed. However, this will not occur to the same extent if deferred from August onwards.

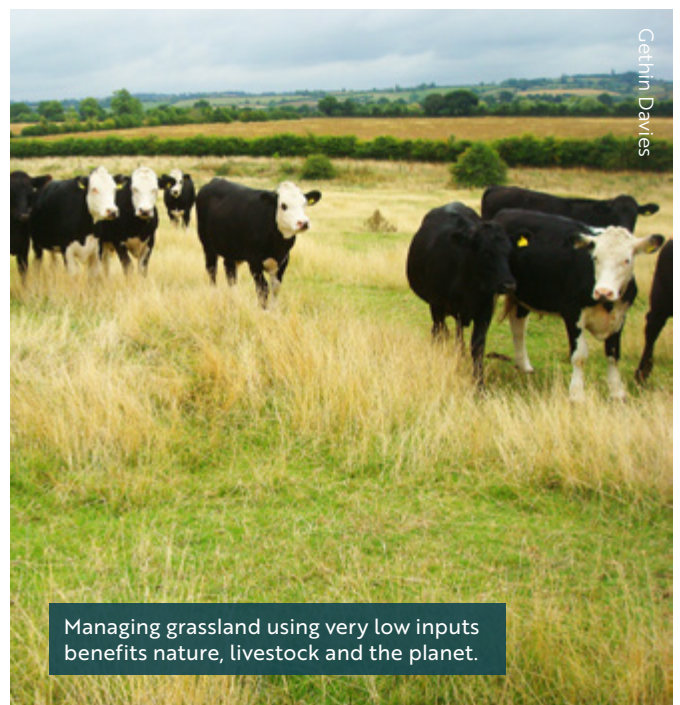
Low-input grassland

Managing grassland using very low inputs has a number of benefits. These include:

- the provision of high-quality forage for livestock
- reduced spending on artificial fertiliser, herbicides and pesticides
- protection of soil from erosion
- provision of habitat for invertebrates, birds and mammals
- more species of wildflowers providing food for pollinators
- reduction in nutrients and pesticides passing into watercourses and groundwater
- the ability to keep soil healthy and carbon-rich
- retention of grassland as part of the traditional landscape character
- improvement of air quality by reducing ammonia emissions from artificial fertiliser.

It is recognised that, in most cases, this would be challenging for many dairy farms in

Northern Ireland. However, it may also be a valuable on smaller less accessible fields or fields draining into watercourses.



Cethin Davies

Managing grassland using very low inputs benefits nature, livestock and the planet.

Multi-species swards

Multi-species swards (MSS) are grass swards which contain three or more species of grasses, legumes and herbs.

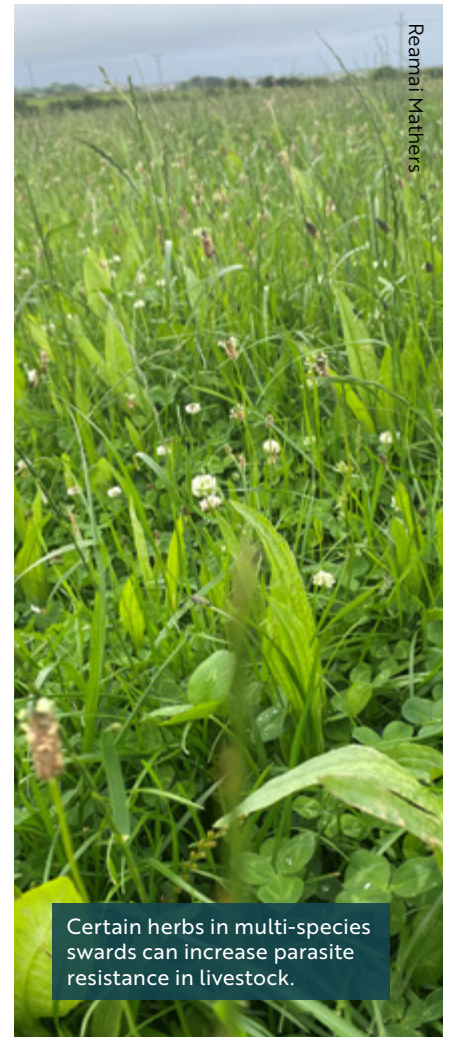
In general, MSS increase nitrogen use efficiency as well as reducing nitrous oxide emissions. MSS also offer a biological approach to soil compaction mitigation. Deep-rooted herb and legume species can have an observable effect on soil compaction by improving soil structure and microporosity.

It is also worth noting that certain herbs (such as Yarrow, Bird's-foot Trefoil and Chicory) have anthelmintic properties and can increase parasite resistance in grazing animals. MSS also have raised water

holding capacity and can provide improved drought tolerance in dry areas.

The use of multi-species grass is possible on every dairy farm in Northern Ireland and can offer improved performance and widen the window for grazing. It is important that MSS are carefully managed within a whole farm grass rotation to ensure persistency of species and to assure higher long-term performance.

To make the most of MSS grazing, farmers should seek specialist advice on the most suitable species mixes and appropriate long-term management techniques.



Implement and use whole-farm soil analysis

Soil is a vital resource, containing a wide mix of living organisms which interact with one another, and with plants and small animals, forming a web of biological activity. The application of nutrients can be beneficial or detrimental to soil health, depending on the soil requirement.

Nature positive farming practices require the development of a five-year soil testing plan, ensuring that soil quality is monitored right across the farm. Effective soil analysis and recording allows the soil to be managed and cultivated in a way that will improve both productivity and biodiversity. Understanding soil conditions also reduces the unnecessary application of nutrients, which improves resource efficiency and economic performance.





Cethin Davies

Clover swards help to reduce the need for artificial fertilisers.

Clover in pasture

With the rising cost of artificial fertilisers, there is merit in establishing alternatives, such as clover swards, to enable a reduction in the amount used.

White Clover is highly digestible and unlike perennial Ryegrass, performs well under low fertiliser nitrogen inputs. White Clover, an N₂-fixing legume grown in association with the grass, is the main legume used, especially in long-term pasture. This approach is effectively utilised within organic systems and has the potential to become established as a priority mitigation for greenhouse gas (GHG) emissions.

On-farm research has shown that where grassland has been converted to clover-based swards on intensively stocked dairy farms, fertiliser nitrogen inputs have been reduced while maintaining or increasing milk output. Likewise, GHG emissions also reduce with the use of perennial Ryegrass/White Clover pasture systems.

Increasing the abundance of legume species in some grass swards can also improve sequestration

and forage quality. In combination with legumes, diverse swards (>4 species) can make grasslands more resilient to climate change, and provide better forage quality and organic matter input.

The benefits of clover in the sward include:

- improved carbon sequestration
- enhanced biodiversity
- improved forage quality
- reduced inorganic nitrogen inputs
- reduced losses to the environment, including GHG emissions.

Forage legumes might also be capable of reducing enteric methane emissions, partly through their condensed tannin content.

Inclusion of clover in grass swards is a key component of the move towards nature positive dairy farms in Northern Ireland.

Optimise slurry application

The slurry application method has a significant impact on nutrient utilisation, with dribble bar and trailing shoe technology improving grass yields by up to 25%.

Ammonia emissions from field-applied slurry can negatively impact biodiversity and public health, while reducing slurry fertiliser value. Airborne nitrogen deposition is a leading cause of the global decline in biodiversity.

Trailing hose and trailing shoe

Using a trailing hose on grassland can reduce ammonia emissions by 26%, compared to splash plate slurry application, while using a trailing shoe can achieve a 57% reduction in emissions.

Slurry injection

Slurry injection on grassland can reduce ammonia emissions by 73% (shallow injection) and 90% (deep injection), compared to splash plate slurry application.

Slurry treatment/additive

Acidification clearly reduces ammonia emissions by around 70% during storage, compared to untreated cattle and pig slurry. The addition of bacterial inoculants showed a positive effect on the reduction of nitrous oxide and ammonia.

Optimise timing

It is essential to optimise the timing of slurry application to maximise nutrient uptake. Spring application has been recommended as a means of reducing nitrate leaching and nitrous oxide emissions because the nitrogen is supplied to a fast-growing crop that can use the nutrients more effectively. The greater uptake of nutrients by the plants means that there is a reduced risk of leaching or run-off of nutrients into watercourses.

Application of slurry later in the year sees a reduced uptake of nutrients by grass, and slurry application levels must be reduced to reflect this.



Dreamstime

The way that slurry is applied has a huge impact on ammonia emissions.



Cethin Davies

Buffer strips can protect watercourses from nutrient leaching.

Implement buffer strips to protect watercourses

On many farms, the implementation of buffer strips at the edge of watercourses can bring significant benefits.

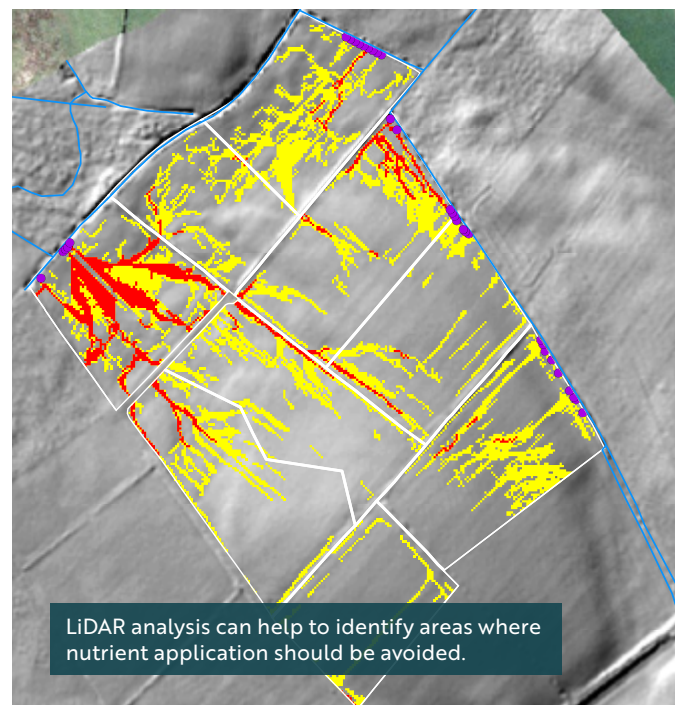
Buffer strips are linear bands of permanent vegetation adjacent to a river, stream or other water body that are intended to maintain or improve water quality. They form a physical barrier between the watercourse and farmed land, and trap and remove various pollutants from herbicides, pesticides and fertilisers.

They also trap sediment from both overland and shallow sub-surface flow.

Buffer strips occur in a variety of forms, including herbaceous or grassy buffers, grassed waterways and forested riparian buffer strips. A buffer strip may provide habitat for a variety of plants and animals if sufficient land area is retained to meet the needs of those species. It can also function as a movement corridor for wildlife if the strip is connected to larger blocks of habitat.

Avoid application of nutrients to areas of high-water flow

Light Detection and Ranging (LiDAR) analysis is being delivered on almost all farms in Northern Ireland as part of the Soil Nutrient Health Scheme. LiDAR is able to identify areas of high-water flow on land. Farmers can use this information to avoid the application of nutrients to these areas either completely, or when weather conditions are inappropriate. This prevents contamination of waterways and benefits biodiversity. As each farm receives its LiDAR report, farmers should carefully consider the areas where nutrients should and should not be applied.



LiDAR analysis can help to identify areas where nutrient application should be avoided.

Use integrated pest and weed management

The application of pesticides in farming is a driver of biodiversity loss, mainly because it reduces the range of plants which are present and reduces the numbers of insects that are available as food for birds and other wildlife. The use of integrated pest management can reduce or even remove the need for pesticides to be used, under certain conditions.

Integrated pest and weed management is the optimal mix of biological, chemical, physical and cultural control techniques and focuses on suppressing pest populations to keep them below

the economic injury level (EIL). It emphasises the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control.

By encouraging natural enemies or predators of target pest species to inhabit the local environment, they may suppress and control the pest population. For example, Green Dock Beetles can be used to control dockens. Mechanical weed removal or targeted chemical treatment can also reduce overall chemical use, but may be more labour intensive.





Integrated parasite management can have benefits for both livestock and wildlife.

Use integrated parasite management

Methods of integrated parasite management include:

Creating worm refugia

Some animals within a herd or flock are not wormed, leaving a population of parasites naive to anthelmintic therapy.

Correct treatment use

Administration of the correct dose of anthelmintic following assessment of the parasitic load and body weight of the animals.

FAMACHA (FAffa MAlan CHArt)

Selective treatment of parasitised animals, leaving healthy animals untreated.

Alternative grazing

Different age groups of livestock or different species graze pastures in sequence, as many parasites exhibit little cross-infectivity between species.

Selective breeding

Selection of animals which are more resilient or resistant to parasites.

Biological control

Using natural enemies of parasites to control their population.



Cethin Davies

Wet features provide habitat for wildlife and offer various ecosystem services.

Create wet features

The creation of wet features, such as ponds, scrapes and ditches, can deliver significant environmental and biodiversity benefits.

Wet features are some of the most crucial ecosystems on farmland, improving the biodiversity of plants and animals, and providing various ecosystem services.

They also bring benefits to pollinators and encourage the presence of beneficial insect predators. The vast numbers of insects produced by wet habitats are a crucial food

source for bats and birds, such as Lapwings and Tree Sparrows.

Wetlands can provide a range of ecosystem services, including water purification, buffering of runoff and river discharge, production of food and fibre, and ecotourism.

Wetlands can be restored by rewetting land and additional restoration measures have the potential to reinstate the original ecosystem services.

Use constructed wetlands to collect and treat dirty water

The practice of collecting dirty water to avoid run-off can have a positive impact on water quality. There are various ways this can be achieved:

- The implementation of integrated constructed wetlands for the treatment of farmyard dirty water can have a major positive effect on water quality and subsequent biodiversity.
- Constructed wetlands are shallow surface flow wetlands that are comprised of several vegetated cells in series. They are recommended for treatment of farmyard runoff as they have the capacity to remove or store pollutants.
- Design new, or amend existing, animal housing to minimise the area that could be contaminated with slurry. Roofs or shelters should be added in external high-traffic areas where waste accumulates, to avoid it being washed into watercourses.
- Divert uncontaminated water, for example roof water, away from dirty areas.

Agroforestry

Agroforestry encompasses a range of systems which integrate trees into the farming landscape, whilst retaining agricultural productivity.

Integrating trees into farming systems can enhance a farm's economic and environmental resilience, while providing opportunities to support biodiversity and nature. Trees provide vital habitats for a range of wildlife, while also absorbing and storing carbon.

One agroforestry practice which may suit dairy farms is silvopasture, which involves planting trees within fields at a low density.

This has been shown to have little impact on grass yields, improves drainage, lengthens the grass growing season and allows cattle to graze outside for longer. Cows are able to browse on the leaves, providing nutritional and health benefits. The trees also provide shelter from the elements, creating more comfortable conditions for the cows and improving their welfare. Trees also provide greater drought and flood resistance and improve soil structure.



Growing trees within fields provides habitat for wildlife and improves the welfare of cows.



Cethin Davies

Arable crops can provide cover for ground-nesting birds.

Arable/wholecrop

Arable crops can be an important resource for wildlife, with spilt grain and weed seeds in the stubble after harvest providing abundant food during the winter. Arable crops can also provide vital cover for ground-nesting birds.

Harvesting cereals for whole-crop silage may be a practical option, enabling fodder to be grown and harvested similar to grass silage, while providing benefits for wildlife. Whole-crop silage involves harvesting and ensiling crops when they are green and drop no seed. Unmown areas can mature to provide grain, and the stubble can provide a source of weed seeds after harvest, with tillage unearthing insects and providing nesting habitats.

Benefits can also be seen by planting crop seed or wild bird cover mixes at field corners or margins, which will not be harvested, to provide food for seed-eating birds.

Additional nesting opportunities

Farm buildings can provide nesting places for a range of bird species, including owls, raptors, sparrows and Swallows. They are also home to a range of mammals, including rodents and bats, and invertebrates.

Traditional farm buildings made of more traditional materials (eg stone walls, lime mortar, wooden rafters) provide the most value for wildlife, due to the heterogeneity of the materials providing various microhabitats and purchase for species to build their nests.

Modern buildings, although often less suitable, can be enhanced through the provision of artificial nesting boxes in appropriate locations.

Specific species can be targeted using different types of boxes or shelters. The placement of boxes or shelters is important and advice should be sought in order to maximise effectiveness.



Reamair Mathers

Many species will readily use nest boxes.

With thanks for the work, support and contributions of:



Stay connected

Keep up to date with the latest thinking, news, events, and information from the RSPB in your local community.



@Natures_Voice



@TheRSPB



@RSPB

Head Office

RSPB NI Headquarters
Belvoir Forest Park
Belfast
BT8 7QT