



Cross Compliance GAEC



Poaching & Trampling

GBR19 Breach

GAEC 5 Breach



Water Margins



Water Margins



Diffuse Pollution Assessment



FARM
ADVISORY
SERVICE



GBR19 Breach

GAEC 5 Breach

Diffuse Pollution



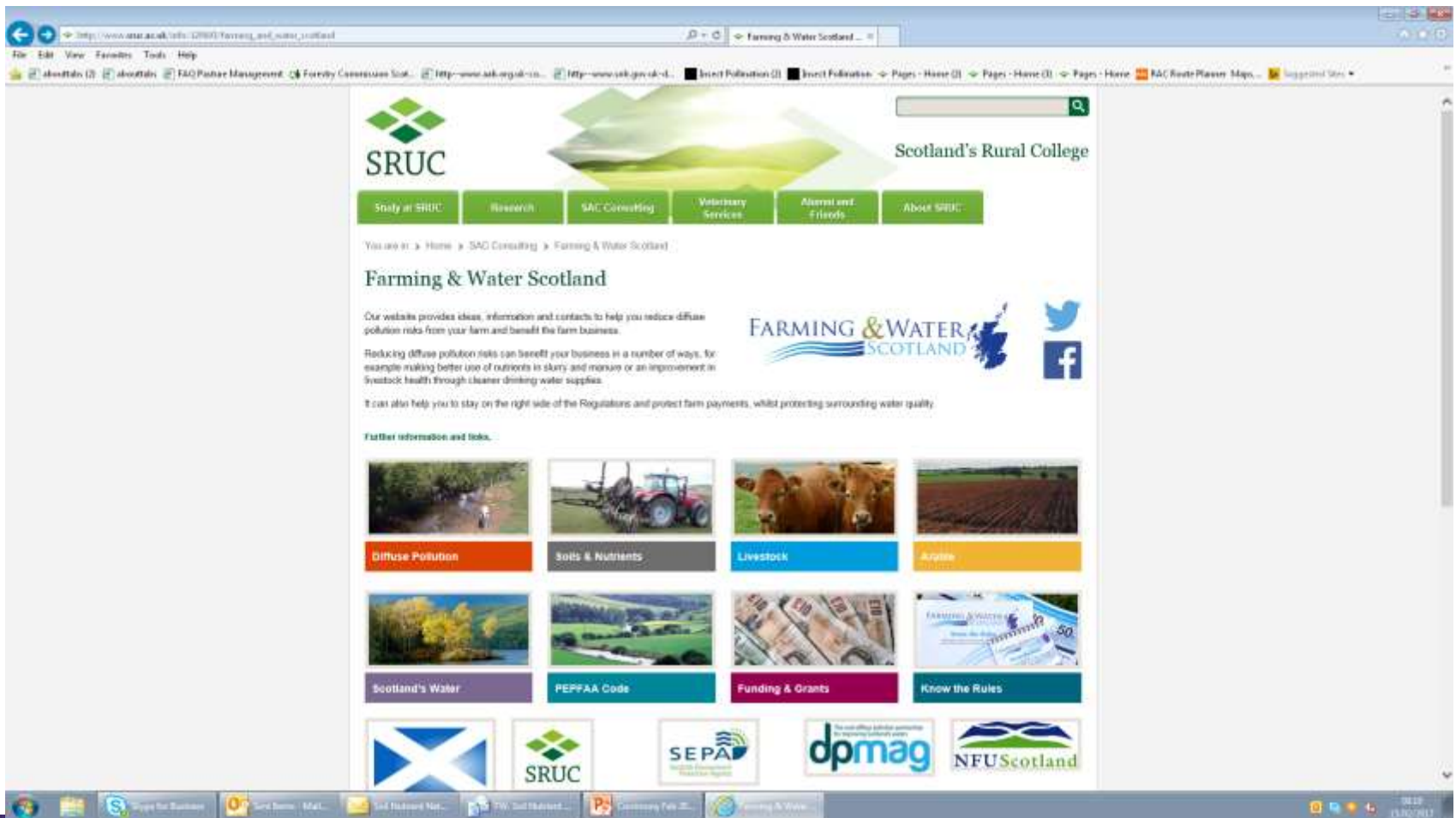
Diffuse Pollution



FARM
ADVISORY
SERVICE



Farming & Water Scotland



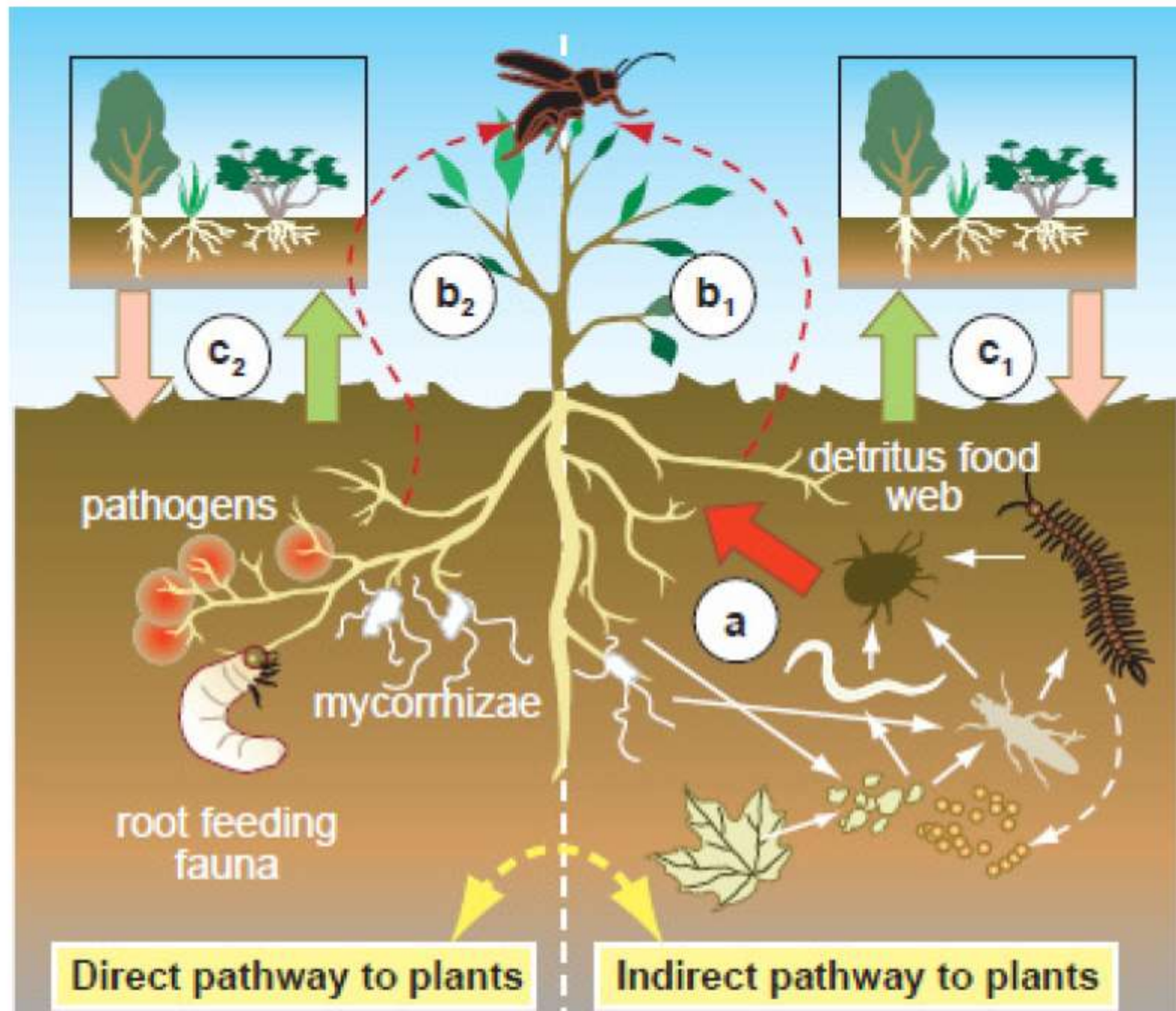
Farming & Water Scotland



Soil Organic Matter

- Soil carbon is the second largest carbon store on earth
- 25% of all living organism live in the soil
- Diminished capacity within the soil ecosystem to function

Linkages between plants and soil organisms



Soil Functions

- Nutrient cycling
- Regulates ecosystem functioning through soil organic matter, soil carbon sequestration, emission of gases (GHG), nutrient availability, modifying soil structure and water, supporting vegetation & provides genetic diversity eg penicillin & amoxycillin

Soil Biodiversity – a food web



- Micro fauna - bacteria, fungi, protozoa, nematodes
- Meso fauna – mites, springtails
- Macro fauna – earthworms, beetles, spiders, larvae
- Plant roots

Farming & Soil health

- In the UK it is estimated that 2.9 million tonnes of soil are eroded each year
- It can take 500 years to replace 25 mm (1 inch) of topsoil
- Chemicals – in UK 31,000 tonnes of chemicals are applied annually which disrupt soil organisms & enter soil, water and air

Management & soil biota

- pesticides affect non target organisms ie beneficial plants, microbes & fungi eg glyphosate reduces grassland mycorrhiza both directly & indirectly

“a change in soil health resulting in diminished capacity of the ecosystem to provide goods & services” = soil degradation (James Hutton Institute)

Grasslands

- Grasslands play a major role in carbon sequestration
- Total carbon can be higher in forestry but the below ground can be greater in grasslands - the most stable carbon is below ground.
- Greater storage of carbon can be achieved through increasing nitrogen fixing legumes, which absorb rather than release carbon to the atmosphere; and by using deeper rooting plants
- Fungi increase with soil organic matter (carbon) - helps restore natural grasslands

Organic Farming Study findings

- Greater plant biodiversity
- More invertebrate biodiversity
 - Beetles, spiders, bees, and butterflies
- Enhanced soil life biodiversity
 - Soil microbial biomass, mycorrhizae abundance, earthworms
- More birdlife biodiversity
 - Particularly invertebrate feeders
- Increased mammal biodiversity
 - Total bat activity significantly higher on organic farms

Species rich grasslands

- Pre 1998 losses of semi-natural grasslands were huge due to agricultural intensification and changes to farming systems
- Plant species diversity declining on enclosed grassland
- Loss of associated wildflowers, butterflies, etc



UK State of Nature Report

Sept 2016



- 56% of UK species are in decline
- of 8,000 UK species assessed, 15% are threatened with extinction
- a by-product of changes in farming practices*; climate change and development
- *in the move towards greater agricultural efficiency land becomes more uniform & has lost small scale landscape features

Bees

- Honey bees declines
- Native bees (solitary bees, bumble bees) many have declined dramatically
- Habitat loss & neonicotinoids
- Threats to crop pollination: £400m/yr (UK)



Butterflies & Moths

- Specialist butterflies have declined due to habitat losses & food plant declines
- Generalist butterflies are stable or have increased



Red Admiral

Specialist Butterflies



- Small blue
- Kidney vetch
- Riverbanks, shingle

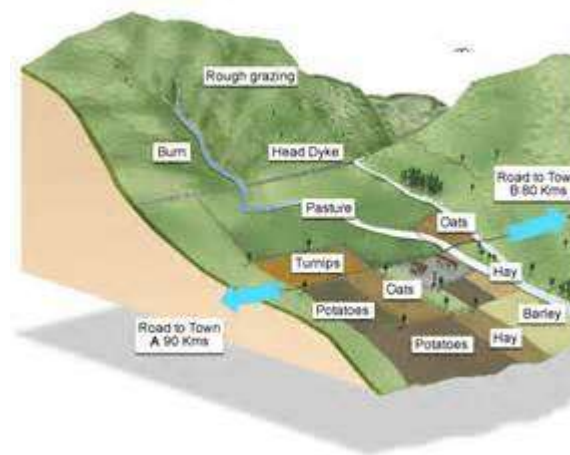


- Northern Brown Argus
- Rock rose
- Base rich soils

*Photographs from
Butterfly Conservation*

Landscape Features

- Cropping
- Hedges
- Ponds
- Rough areas
- Scrub
- Tree-lines
- Woods



High Nature Value Farming



- Low-intensity pasture systems
- Landscape and historical features such as natural floodplains, hedges, ditches, ponds, woods
- Priority habitats and species

Seasonal Grazing



Removal of Grazing



Hedges



- Blossom – nectar & pollen
- Shelter – stock & wildlife
- Wildflowers - nectar
- Litter layer used by over-wintering insects

Habitat Grazing Impacts

- All habitats require some grazing
- Grazing varies with plant species, soils, grazing animals, season, growth
- Pressures of grazing vary over seasons as well as over years

Seasonal Grazing



Woodland Grazing

- Grants for livestock exclusion or restricted woodland grazing
- Fences, gates, water troughs



Semi-Natural Woodlands



- £100/ha/yr restricted grazing /bespoke management plan
- £49/ha/yr livestock exclusion
- £25 deer control
- Stock fence £5.50/m
- Deer fence £8.50/m
- Gates £170/ £215 each

Woodland Creation

- Capital grants
- Annual payments



Under-grazing

- Tall vegetation
- Litter layer or moss
- Few small herbs and flowers
- Coarse grasses
- Weeds
- Shrub or tree regeneration



Under-grazing



Under-Grazing



Over-Grazing



Over-Grazing

- Very short sward
- Reduction or loss of herbs and flowering plants
- Selective grazing
- Mossy
- Some habitats can at least partially recover



Thank You

