Habitat Management

Week 5: Farmland

Introduction

- Communities
- Management principles
- Pesticide and fertiliser use
- Crop management
- Uncropped habitats
- Flooding regimes

- Lowland agriculture
- 19.6% cereals, crops & horticulture (14.9% cereals alone) (Hill *et al*., 2009)
- Cropped and uncropped land
- Intensification – exclusion non-crop pests & competitors

Resultant problems:

- Fragmentation
- Drainage wet meadows
- Loss of edges
- Pond infilling
- Hedgerow removal
- Abandonment rotations
- Inorganic pesticides
- Autumn sown crops
- Earlier hay making
- Introduction new cereals

Change to farmland	Ecological impact	Wildlife responses
Hedge removal	**Loss of habitat infrastructure; increased field size – soil erosion**	**Reduced species dispersal; decline in mammals, owls, invertebrates; loss of food sources**
Pond infilling	**Loss of habitat**	**Decline in newts, frogs, aquatic vegetation;**
Timing of cultivation	**Autumn sowing; reduced stubble**	**Reduced invertebrates; fewer wintering birds;**
Fertiliser application	**Denser crop; nitrate leachate, fewer manure stacks**	**Reduced vegetation diversity; decline in insects; water course quality**

Farmland Communities

- 300 flowering species
- Many cereal weeds rare
- Cornflower *Centaurea cyanus*; Corncockle *Agrostemma githago*; Pheasant's Eye *Adonis annua*
- 1800 Arthropods
- Birds – broad habitat requirements

Farmland productivity

- Underlying geology
- Climate
- Regional variation on wildlife
- Lower lying East UK – tillage
- North and west – livestock
- More species associated with eastern areas due to farming activity, climate and fertility
- Specialisation vs diversification

Management Principles

- **Maximise biodiversity & conserve habitat features**
- **Design for particular species**
- **Consider the unknown species**
  - **Retain existing habitat management**
  - **Increase semi-natural habitats**
  - **Create structural variation**
  - **Establish plant variation within new habitats**

- Few restricted species
- Corncrake *Crex crex*; Lapwing *Vanellus vanellus*; Stone Curlew *Burhinus oedicnemus*; Quail *Coturnix coturnix*
- Also Barn owls *Tyto alba* – retained old trees, barns and outbuilding

- ***"The decline of the corncrake has been one of the most obvious effects of the industrialisation of farming across Europe. Subsidies paid to farmers to maximise output have driven it out of much of the EU. This has been so marked you can pick out the outline of the Common Agricultural Policy imprinted on the distribution map of the bird"*** **(Wynne, 2004. Chief Executive RSPB)**

Maximising biodiversity

- Inter-relationship between land for crops production (cropped) and marginal land (uncropped)
- Landscape mosaic:
  - Increase crop variation
  - Tillage vs grass
  - Mixed livestock and arable
  - Enhancement marginal and ‘edge’ habitat

Maximising Biodiversity

- Fragmentation – increases mosaic structure
- Avoid isolation
- Small wood surrounded by vast areas of crops vs. landscape cereals with small copses interlinked by hedgerows
- Former - less wildlife value

Management advice

- Tree planting
- Reduced reliance on pesticides etc:
  - Creation/restoration ponds & hedgerows
  - Grass track/ride establishment
  - Creation herb-rich meadows
- Set aside
- Application government schemes

5 Existing Agri-Environmental Schemes (Wales)

- **Tir Gofal**
- **Tir Cynnal**
- **Tir Mynydd**
- **Organic Farms**
- **Better Woodlands**

Glastir - 2012

Agri-environmental Schemes

- Tir Gofal (run under CAP since 1999):
  - Maintain and enhance agricultural landscape and wildlife
  - Provide opportunities for people to visit the countryside
- Four elements
  - Land management
  - Creating new permissive access
  - Capital works
  - Training for farmers

Getting started

- Archaeological features
- Rare species?
- NRW/English Nature – SSSIs
- Access/rights of way
- Current farming system - level of available resources & commitment

Management Options

1. <u>Alteration to cropping regime</u>

- Organic farming (crop rotation; crop residues, mixed farming - manure)
- Introducing new crops – pest resistance
- Mixed farming – slurry vs inorganic fertiliser
- Cattle slurry has been shown to increase biomass of earthworms in arable soil significantly cf inorganic fertilisers.

Management Options

2. <u>Management Field Margins</u>

- Area between hedgerow and crop:
  - Grass strips
  - Wildflowers
  - ‘Conservation headlands’

Grass Margins

- Map - interconnectivity
- Seed bank – natural regeneration
- Perennial grass strip
- Grass mixture 85:15 grasses to broadleaves (Dandelion, clover)
- Sow according to soil porosity
- Autumn sowing
- Mixture chosen affects cutting frequency

Grass margins

- Avoid inputs
- Spot treatment
- Pesticide drift
- Ploughed field – turned in furrow
- Maintenance – grazing or cutting

Wildflowers

- Site selection
- Stubble
- Delay sowing of crops
- No nitrogen fertiliser
- Selective herbicide application

Conservation Headlands

- Havens for gamebird chick, butterflies and other invertebrates
- Area between crop-edge and first tramline – treated with selective pesticides
- Siting is important
- Rare arable weeds

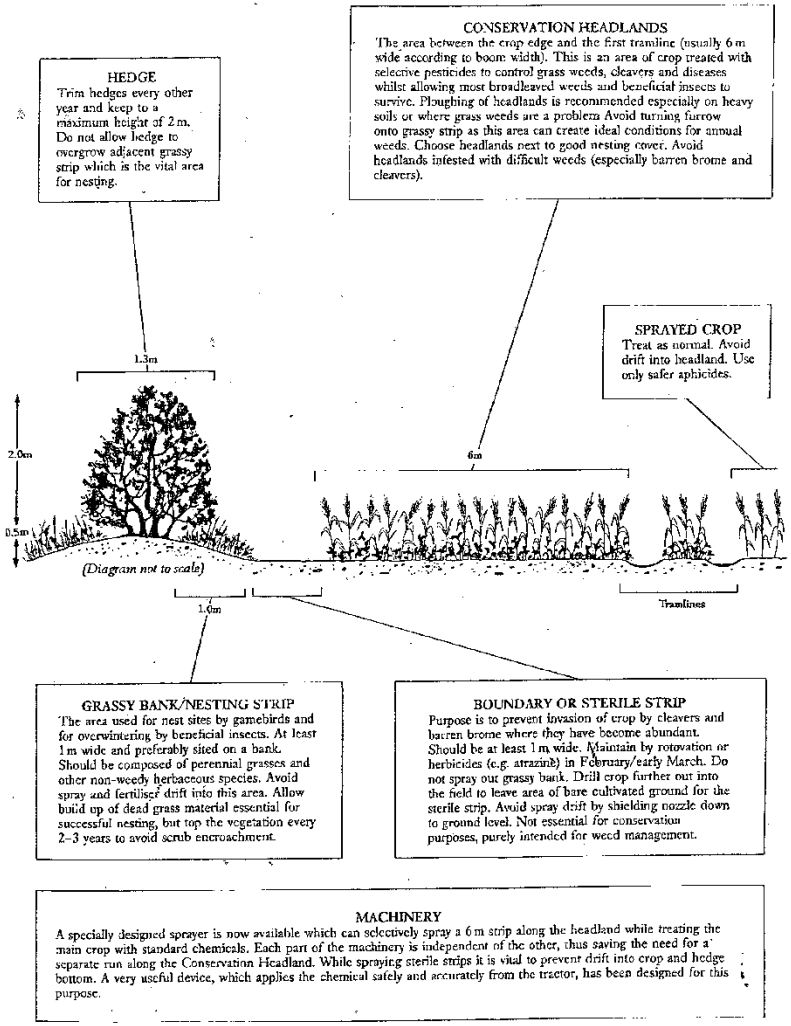


Fig. 9.3. Layout of a Conservation Headland.

Conservation Headland (Sutherland and Hill, 2009:247)

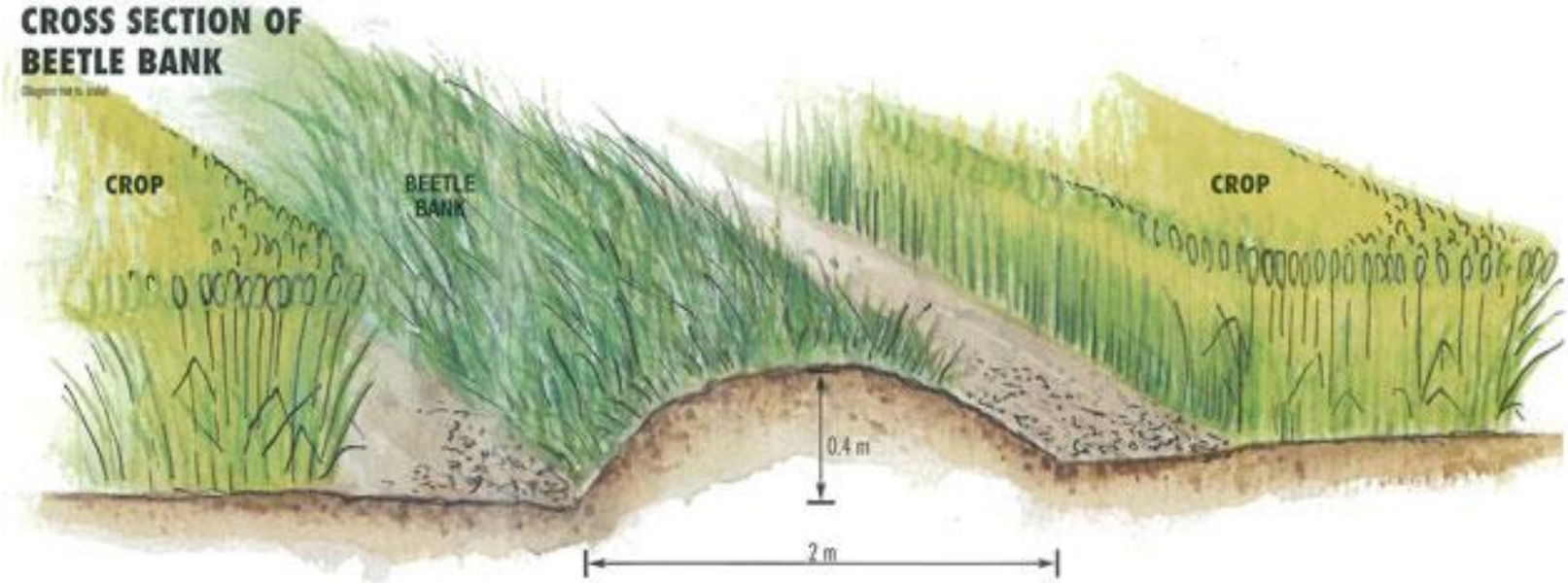
Thinner crop on the left – sown at half conventional quantities – allows more light – more successful conservation headland

Cut margin and uncut area provide for biodiversity

(UK Agriculture, 2010)

Beetle Banks

- 1000 predators per square metre of perennial tussocky grass
- Ridge or earth bank – 2 directional ploughing
- 25m gap at each end of bank plus grass strip


CROSS SECTION OF
BEETLE BANK
CROP
BEETLE
BANK
CROP
0.4 m
2 m

Ditches and dykes

- Allow land to be drained – create favourable soil conditions for cropping
- Corridors for wildlife

Exclude stock where possible – bank erosion

Shallow slopes – south facing

Protect with grass margins – pesticide contamination

Dykes/Ditches - Management

- Clear and trim to ensure through-flow of water – autumn/winter
- Rotational cutting – 3-4yrs for dry ditches; 8 yrs for waterlogged ditches
- When cutting banks – leave 10-15cm vegetation – provide cover & food sources
- Avoid chemical applications, silage effluent, slurry & yard washings and remove cutting

Set Aside

- Richer in wildlife
- Permanent >10 yrs
- Proportional – 15%
- Wildlife value depends on:
  - Time since cropping
  - Sown or self generated
  - Subsequent management

Manipulating Flooding Regimes

- Shallow flooding:
  - Rice cultivation
  - Control pest species – nematodes on potatoes, flower bulbs, soybeans
  - Flood intolerant weeds

Flooding Rice Stubble

- Increases value waders
- Speeds up decomposition rice straw
- Inhibits weed growth
- Reduces cost of preparation for next year’s sowing

- Hill, D., Andrews, J., Sotherton, N. and Hawkins, J. (2009) Farmland. In Sutherland, W.J and Hill, D.A (2009). *Managing Habitats for Conservation*. Cambridge Press (10th Edition): 230-266

- Ausden, M. (2010) Arable Land. *Habitat Management for Conservation*. Oxford University Press (3rd Edition): 331-354

Student Work

- Next week: Student seminars
- You will be running the class!
- Aim for 30 min – plus open discussion