‘Chimney Meadows: Enhancing and Restoring Floodplain Meadows’
Chimney Meadows

- BBOWT’s largest nature reserve (>260ha)
- Species-rich grassland
- Wetland habitats
Arable Reversion

• In 2004, following the purchase of Chimney Farm, 70ha (170 acres) of arable land, was reverted back to hay meadow, using a method known as green hay spreading.
• One of largest arable reversion schemes in the country, at the time
Arable Reversion

Phosphate Levels (Scale 1-5)

Previous management:
- a. Set-aside
- b. Spring barley
- c. Winter wheat
Arable Reversion

Ex-arable field preparation:

- Sheep grazed off grass and weeds, that had grown amongst the stubble
- Remaining vegetation sprayed off
- Dead vegetation topped
- Disc harrowed to turn the dead vegetation into the soil, creating seed bed
Arable Reversion

- Floodplain Meadows Partnership surveyed NNR
- Marked out most floristically diverse areas
- Mid-July, donor fields cut.
- Vegetation raked into rows, collected by double chop forage harvester and blown into trailers
- Material transported to receptor fields and dumped in piles
- Muckspreaders loaded with chopped up green hay and its seed, spread material across fields (ratio approx. 1:3)
- Rolled to make sure good contact with soil
- Left to germinate!
Arable Reversion: Management

- Topped vegetation (10-15cm), to keep sward open and encourage germination of other plants e.g.: yellow rattle – light demanding
- Hay cut July/August
- Followed by aftermath grazing, by sheep
- Currently, moving to cattle/mixed grazing to create a more varied sward.
- P3 field - same as other low phosphate fields.
- P4 fields – thick grass sward grew very vigorously, with few herbs. Been grazed and weeds topped for 10 years. Fertility has dropped. Sward is becoming similar to that found on other arable reversion fields - cowslip, knapweed, fairy flax, pepper saxifrage
Arable Reversion: Monitoring

• What was the effect of green hay spreading versus not treating with green hay?
  • 30m x 30m control plots in each field did not have green hay spread on them
  • These were compared with adjacent treatment plots that did receive green hay

• How closely do the reverted fields match the original donor fields?
  • Contrast plots of 30m x 30m were also monitored on the NNR
Arable Reversion: Monitoring

Fixed Point Quadrats

Botanics
• Species composition
• Sward structure - height

Invertebrates
• Pitfall trapping (e.g. ground beetles, spiders)
• Pan trapping (pollinators – e.g. bees, hover flies)
• Suction sampling
• Earthworm density
Arable Reversion: Monitoring

Visual Differences

Control Plot

Treatment Plot
Jaccard's similarity is a binary similarity coefficient.

**Treatment:** $F_{1,14} = 33.7, p<0.001$

**Year:** $F_{2,26} = 15.2, p<0.001$

**Treatment*Year:** $F_{2,26} = 1.03$ ns

* Jaccard's similarity is a binary similarity coefficient.
Summer Flooding
Summer Flooding 2007/8 (NNR)

- Loss of green winged orchid – not been seen since 2007
- Marked decrease in cowslips – very obvious change
- Increase in large sedges and tufted hair grass
- Impact on curlew – decline in breeding success, which may be due to reduced invertebrate food e.g.: worms
Impact of Summer Flooding 2007 and 2008

NNR Species Richness

Species Richness

Year

2006
2008
2009
2010
Restorative Hay Meadow Management

- Floodplain Meadows Partnership newsletter, outlined the importance of an early hay cut to restore hay meadows
- 2011, started hay cut earlier than usual, having checked there were no curlew breeding, to maximise our window of opportunity to cut the hay
- In spring 2012, it was apparent that the fields on the NNR were starting to improve, however, it began to rain and rain and rain!
- We were unable to cut all the meadows again, as the ground was too wet for machinery. We needed to graze them off in strips, but had no fencing or water for cattle and the grass was too long for sheep.
Restorative Hay Meadow Management

- Late spring 2013, ground dried up enough to get a tractor on to the NNR to cut a line of grass to enable use of electric fencing.
- Able to install pasture pumps, to provide a supply of water for cattle.
- The animals successfully, grazed off the rank vegetation, ready for hay cutting once more.
- Timing of grazing was not good for the curlew, but we had to prioritise getting the meadows back into condition, to the benefit of curlew in the future.
Restorative Hay Meadow Management

- It has become apparent that we cannot continue to manage Chimney Meadows in its entirety without better access, water supply and fencing to enable flexible restorative grazing following floods/wet summers.

- 1:100 year floods as shown by EA flood map have occurred 4 times in last 7 years, including this winter when Chimney Meadows was flooded from Boxing Day to approx. end March.
WREN Biodiversity Action Fund
‘Enhancing and Restoring Floodplain Meadows’

• £207,000 over 3 years, starting January 2014
• Biodiversity Action Fund administered by WREN, a not-for-profit business that awards grants generated by landfill tax through sites owned by FCC Environment, to community, environmental and heritage projects countrywide.
WREN Biodiversity Action Fund – Enhancing and Restoring Floodplain Meadows

What’s Involved?

Capital Works (mostly contractor):
• 1500m piped water to NNR
• 11000m stock fencing; 400m barbed wire
• 800m access improvements inc. 3 culverts
• 3211m maintenance ditching
• 380m footdrains (reduce sedge)
• 23ha green hay spreading
• 10 pollards
WREN Biodiversity Action Fund – Enhancing and Restoring Floodplain Meadows

Livestock/equipment purchase:

- 10 Dexter cattle, 30 sheep
- Livestock handling systems
- Feeding/drinking troughs
- Electric fencing
- Fire skip (brash from pollarding)
Arable Reversion – WREN

Research:
• Initial monitoring has shown the arable reversion to be a success, but fields still developing (bee orchid, broomrape, pyramidal orchid)
• 10 years on want to review progress as part of building up a long term data set
• In particular, want to continue to look at invertebrate colonisation – plants aren’t everything!
• Contractors employed this year to re-do some of initial surveys
Volunteers

WREN
• Training – tractor driving, first aid, brushcutter, chainsaw
• Stock watching
• Meadow surveys
• Fence line preparation, ready for contractors
• Pasture pump installation
• Livestock handling pen construction
• Pollarding
• Vegetation management
• Fence maintenance

Couldn’t manage the site without them!
Thank for Listening