RESTORATION OF CLOSED LANDFILL AT BROUGHTON CRAGGS

WRAP TRAILBLAZER PROJECT

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ECOLOGICAL RESTORATION CONSULTANTS

PROJECT TEAM

- Officers in Cumbria County Council's Waste Management Department
- Waste and Resources Action Programme
- Envirolink Northwest
- Ecological Restoration Consultants

PROJECT STAGES

- POT TRIAL MAY - OCTOBER 2008
  NESS BOTANIC GARDENS

- FIELD TRIAL COMMENCED
  NOVEMBER 2008

- WILL BE MONITORED UNTIL
  SPRING 2011

THE FORMER LANDFILL SITE

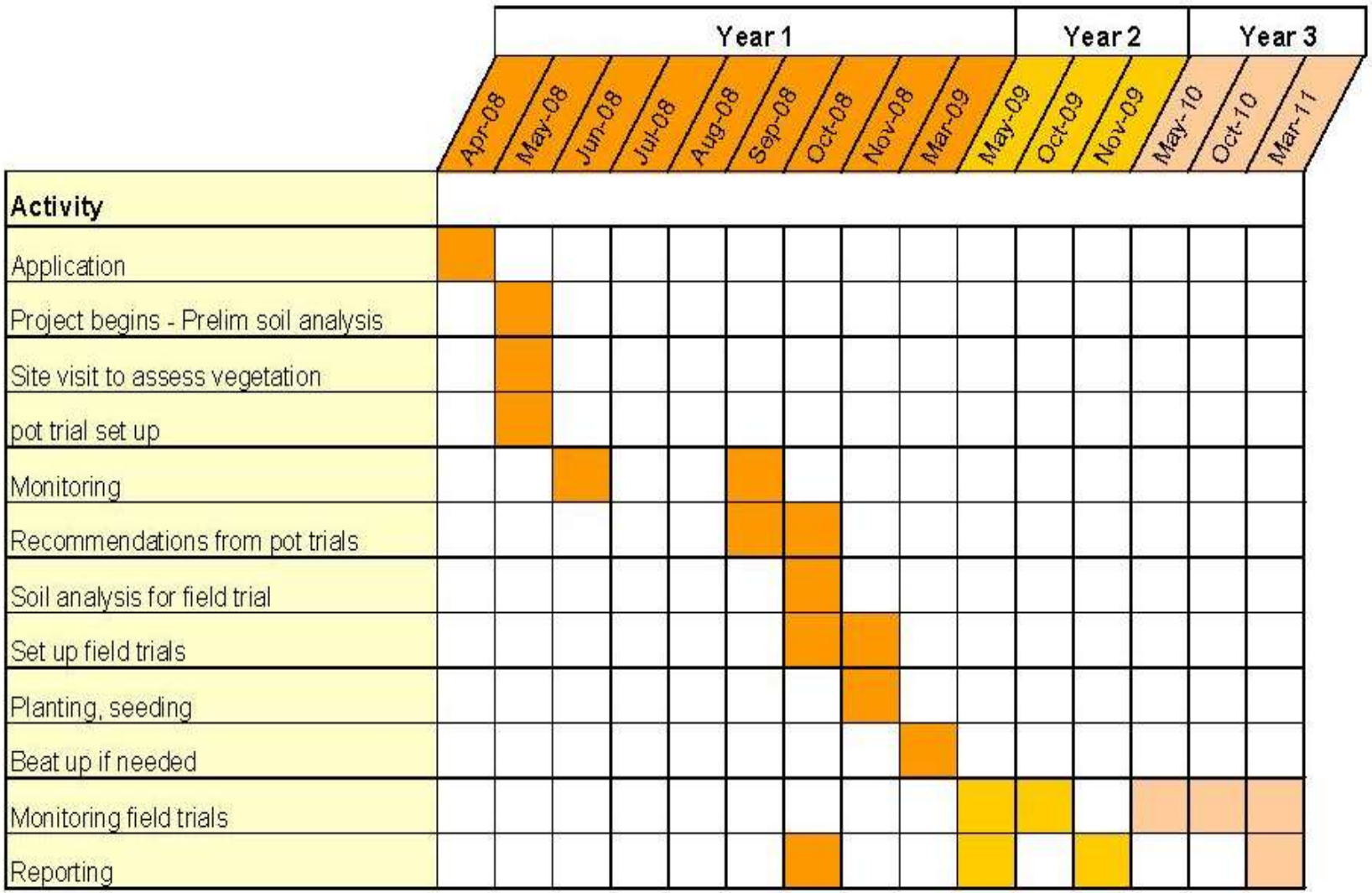
Views before trial set-up commenced

- Baseline soil samples
- Vegetation species assessment

August 2008

Broughton Craggs site is known to support a population of red squirrels and one aim of the trials is to provide recommendations for tree species that will be favourable for red squirrels and not encourage grey squirrels.

TRIAL PROGRAMME 2008 - 2011



POT TRIAL NESS BOTANIC GARDENS

AIM

- To test blends of soil derived from either composted green material or from food-included compost to determine their suitability to support growth of trees and species-rich meadow grassland

- To inform decision making for selection of soil: compost blend ratios for the field trial

EXPERIMENTAL DESIGN

5 soil blends x 3 tree species x 3 replicates

NATIVE TREE SPECIES

- Common alder - *Alnus glutinosa*
- Silver birch - *Betula pendula*
- Scots pine - *Pinus sylvestris*

(cell grown – Alba Trees, Midlothian)

MEADOW GRASSLAND SEED MIXTURE

Suitable for a soil with pH 7.0 – 8.0

23 species of wildflowers 8 species grasses

(Emorsgate Seeds)

NESS POT TRIAL
MID SEPTEMBER 2008

GROWTH OF SCOTS PINE IN THE DIFFERENT SOIL BLENDS

30% food-included compost

15% green compost

TREE GROWTH : CONCLUSIONS

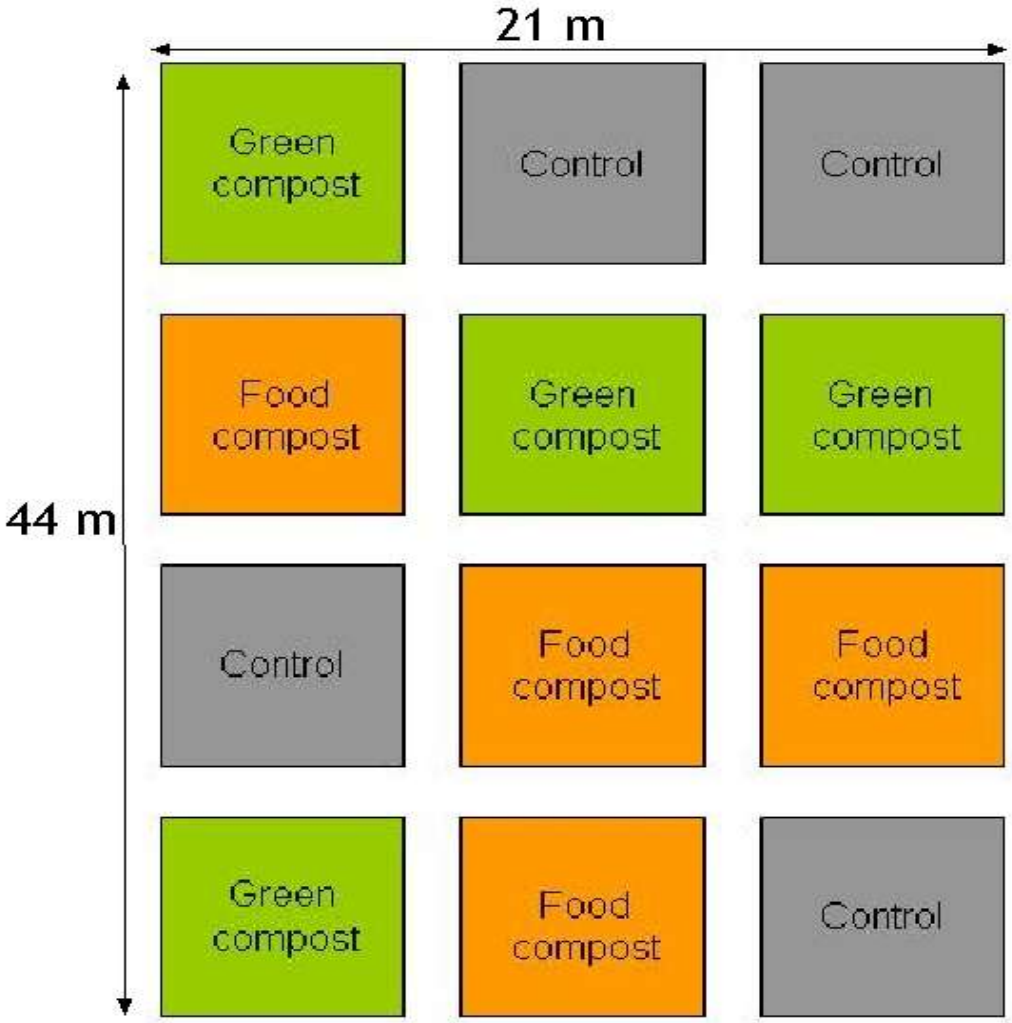
- The variation in tree growth response of the three tree species creates a difficulty in determining the optimum soil blend for the field trial.

- Alder better growth - green compost
  Birch better growth - food-included compost

- Compromise optimum blend moderate proportions of both types in the trial.

- 15% - 20% PAS 100 green compost and
  10% - 15% PAS 100 food-included compost (v/v)

EXPERIMENTAL DESIGN
Plot layout – soil mix treatments



4 replicates plots (7m x 11m)

3 treatments
Randomly allocated

Treatment 1.
Control – no amendment

Treatment 2.
Compost derived from food: TEG

Treatment 3.
Compost derived from
green waste: AW Jenkinsons

EXPERIMENTAL TREATMENTS

Soil blend treatment	Quantity of compost	Cost inc. VAT
Control		
17% green compost : 83% soil	74m^3	£1010
14% food compost : 86% soil	60m^3	£1080

Placement depth 700mm minimum

TREE SPECIES USED IN FIELD TRIAL
Unfavourable for grey squirrel

- Ash — *Fraxinus excelsior*
- Common alder — *Alnus glutinosa*
- Grey willow — *Salix cinerea*
- Silver birch — *Betula pendula*
- Scots pine — *Pinus sylvestris*

7 x 11m plots - spacing 1.4m

25 trees per plot

PRELIMINARY SITE INVESTIGATION

- Analysis of *in situ* soils in trial area
  6 x composite samples (5 sub samples)
- All metal concentrations – low
- Organics – some high PAH values

Pre-trial site works

- Bring surface up to final level
- Soil samples through profile of stockpile No. 2 provided insurance that material was uncontaminated

SUB SOIL SCREENING AND MIXING

Vibrating finger power screen

Screening out large stones > 60mm

PLACEMENT OF SUB-SOIL /COMPOST BLENDS ON TRIAL SITE

Section through green compost and sub-soil blend

Placement on trial area

ANALYSIS OF SUB-SOIL CONTROL AND BLENDS OF COMPOST/SUB-SOIL

Chemical determinand	Control subsoil	Composted food waste : subsoil mix	Green compost : subsoil mix
pH	7.3	7.4	7.1
Phosphorus	34	33.7	56
Potassium	87	232	447
Nitrate-N	5.2	0.05	22.9
Ammonium-N	3.5	7	2.3
Total Copper	46	42	48
Total Lead	56	48	59

SETTING UP TRIAL – PLANTING TREES

Positioning stakes for tree guards

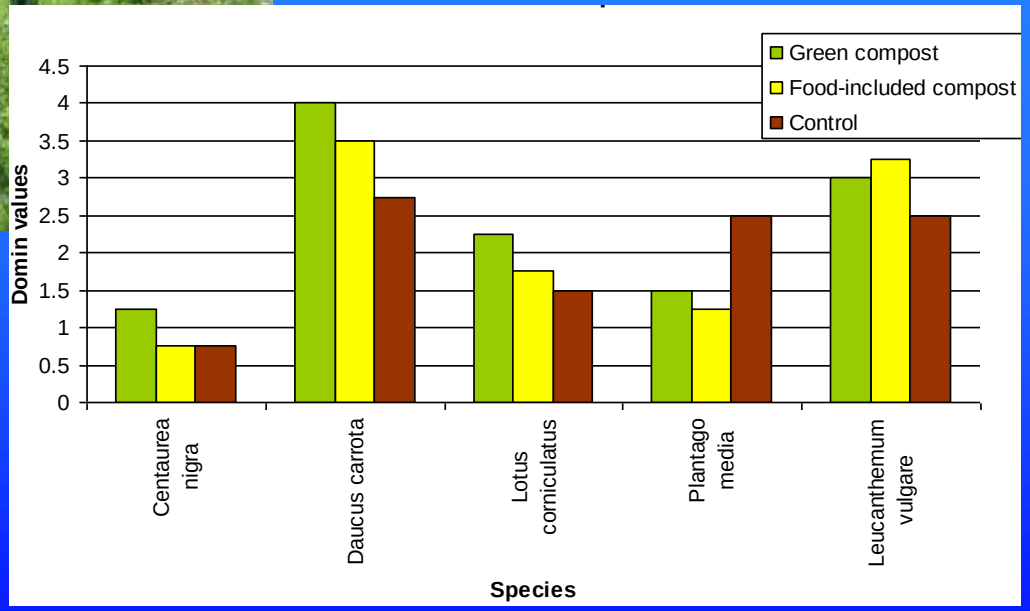
Completed trial area planted with 5 tree species

EARLY ESTABLISHMENT OF MEADOW GRASSLAND 26TH MAY 2009

Control sub-soil 30% vegetation cover

Green compost blend 70% vegetation cover

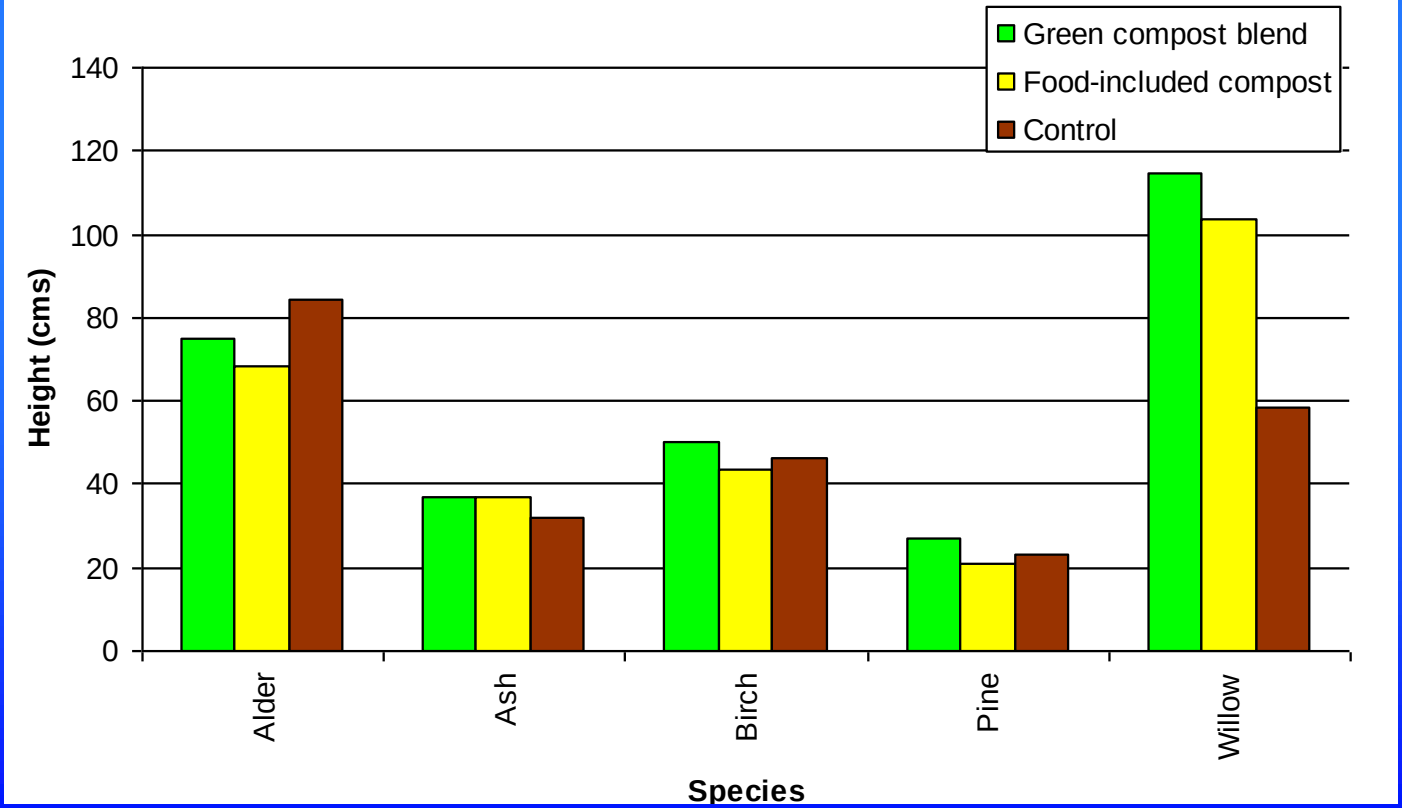
MEADOW GRASSLAND VEGETATION ASSESSMENT 23RD JULY 2009



SURVIVAL AND GROWTH OF TREES

Survival - all species > 93% survival except Scots pine (90%)

Overall mean mortality 5.7%



CONCLUSIONS

- Survival of all tree species was excellent – above normal for brownfield land
- Tree growth response not expected during the first growing season
- Good establishment and growth of meadow grassland in all treatments
- Food compost blend – higher biomass reflected higher soil nutrients – N and P

COMMUNITY STAKEHOLDERS
Great Broughton Council
July 2009