SCOTTISHPOWER RENEWABLES

Defining Quantifiable Objectives and Monitoring Methods for Habitat Management Plans

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Overview

Keep the process simple:

1. Describe what is wrong
2. Define objectives
3. Make a restoration plan
4. Install a monitoring framework

Describe What is Wrong

Blanket bog example

Do not just say it is M20!

Overgrazed, Drained, Afforested, Ploughed, Fertilized, Burnt, Eroding?

Be specific about the effects on the habitat *compared to reference condition*:

- Low dwarf shrub cover or stature
- High abundance of grazing tolerant species
- High frequency of poaching or trampling damage
- Low cover of *Sphagnum* species
- High cover of bare peat
- Drainage features present

Define Objectives

Five key elements of objectives

i. The feature (e.g. species, water table)

ii. The attribute (e.g. presence, cover, frequency, density, depth)

iii. Define the spatial extent

iv. Quantity/Trend (e.g. cover threshold, increase/decrease)

v. (Time frame)

Bad Objectives

- Enhance the condition of existing degraded blanket bog **1/5 (Feature)**

- Ensure blanket bog vegetation communities are maintained and enhanced (NVC communities M1, M18, M19 & M20)
  1.5/5 (Feature, Quantity)

- In areas suitable for heathland habitat achieve the regeneration of species from typical heathland communities such as *Calluna vulgaris, Eriophorum* species, *Deschampsia flexuosa* and *Molinia caerulea*
  2/5 (Feature, Extent)

Better Objectives

Group	Objective	Description
Bog water table	1.1	The bog water table should be no deeper than 20cm from the surface of the main peat mass on each sampled plot when assessed in summer 'drought conditions'
Tree regen	2.1	Conifer trees, broadleaf trees and non-native shrubs (e.g. Rhododendron) should be absent from each sampled plot
Sphag. and peat	3.1	At least one species of Sphagnum should be present on each sampled plot
	3.2	Sphagnum spp. should account for at least 30% of basal cover on each sampled plot
	3.3	Bare peat should comprise <1% of 'basal' cover on each sampled plot
Higher plants	4.1	*Calluna vulgaris* of at least 20cm average canopy height and with < 20% leading shoots browsed should be present on each sampled plot
	4.2	'True grass' foliar cover should be less than 5% on each sampled plot
	4.3	*C. vulgaris, Eriophorum spp. and Tricophorum cespitosum* should account for no more than 75% of foliar cover on each sampled plot

Make a Restoration Plan

- Describe the measures you will implement, how and where they will be done
- Are you confident they will work? **If not, use trials first**
- Do some issues need to be addressed before others can be carried out?
- Prioritize according to urgency, budget and resources available
- Are there associated environmental or H&S considerations requiring mitigation?

Photo: trial plots to test potential Dorset heath restoration methods

Why most conservation monitoring is, but need not be, a waste of time
Legg and Nagy (2005)

"The results of inadequate monitoring can be both misleading and dangerous not only because of their inability to detect ecologically significant changes, but also because they create the illusion that something useful has been done."

Monitoring

You cannot measure everything, everywhere

i. Undertake a pilot study to test methods and collect sample data to assess spatial autocorrelation and sample variability

ii. Produce a monitoring protocol, ensure a competent person can follow methods: unambiguous, objective, robust

iii. Calculate required sample size: how precise must the estimates be to detect the required level of change?

iv. Devise an unbiased sample layout using permanent plots

v. Ensure field markings are robust

vi. Start monitoring!

Pilot Study and Protocols

- Test your methods among multiple observers – are results the same?

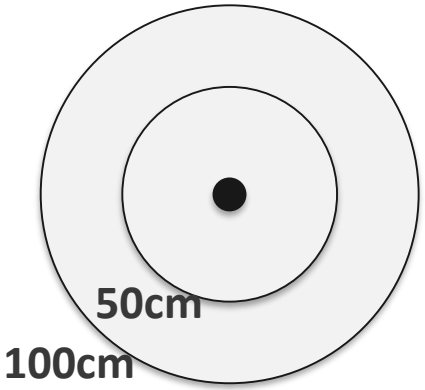
- Abundance: Frequency vs cover

Frequency is quick and easy to measure, is stable throughout the season and represents the occurrence over the sampled area

Cover is slow and difficult to measure precisely, observer bias is high for visual methods, changes with season, and needs to be multi-layered depending on basal/foliar species

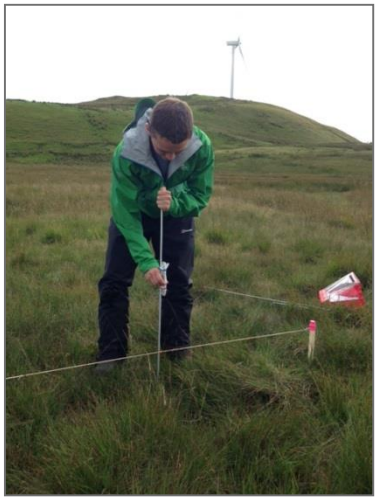
- Try different shapes and sizes of sampling unit – long and thin best for clustered habitats

- Write a step-by-step monitoring protocol



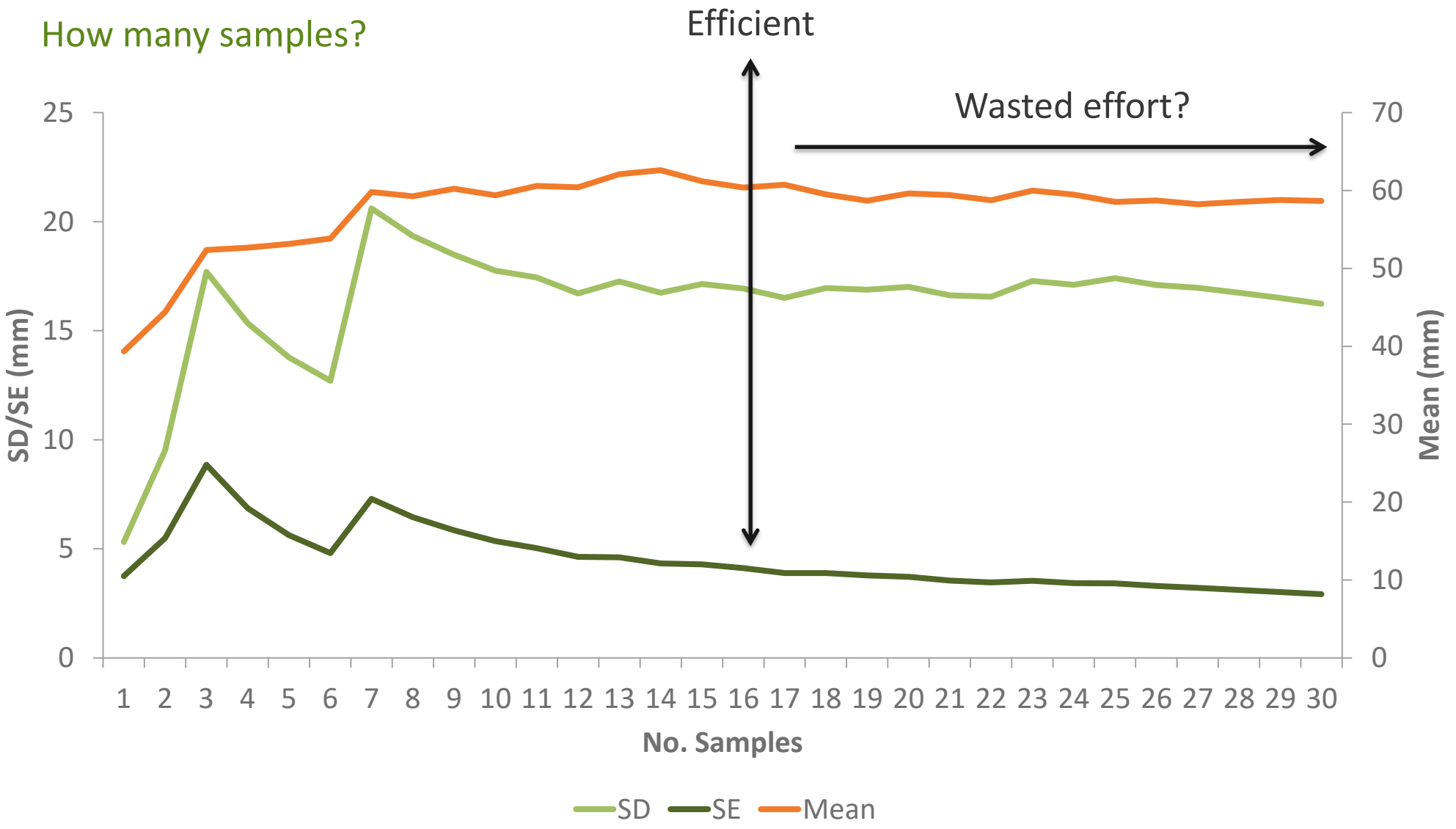
Quadrats don't have to be square! Circular quadrats allow nesting of sampling unit sizes for frequency surveys from a single permanent post

Photo: using a pin frame along a fixed line transect to measure cover in blanket bog



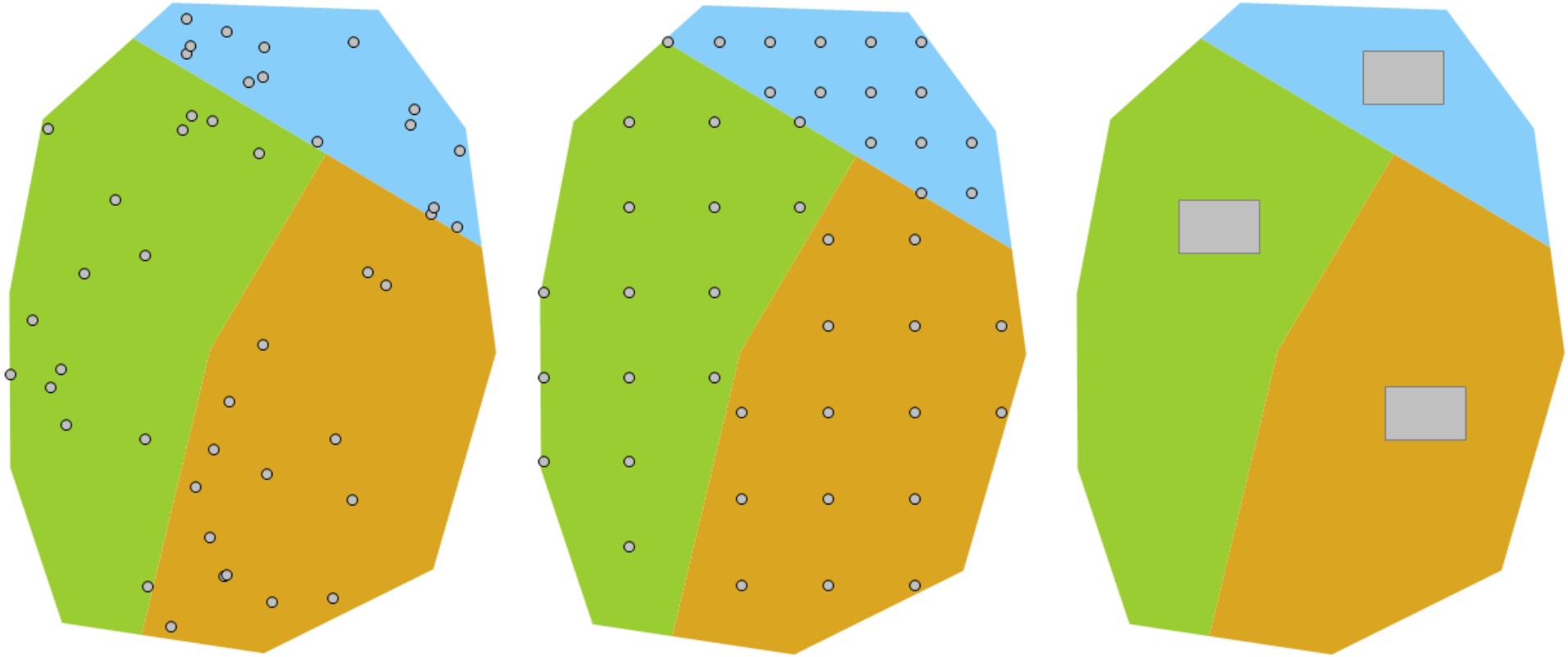
Sample Size and Replication

How many samples?



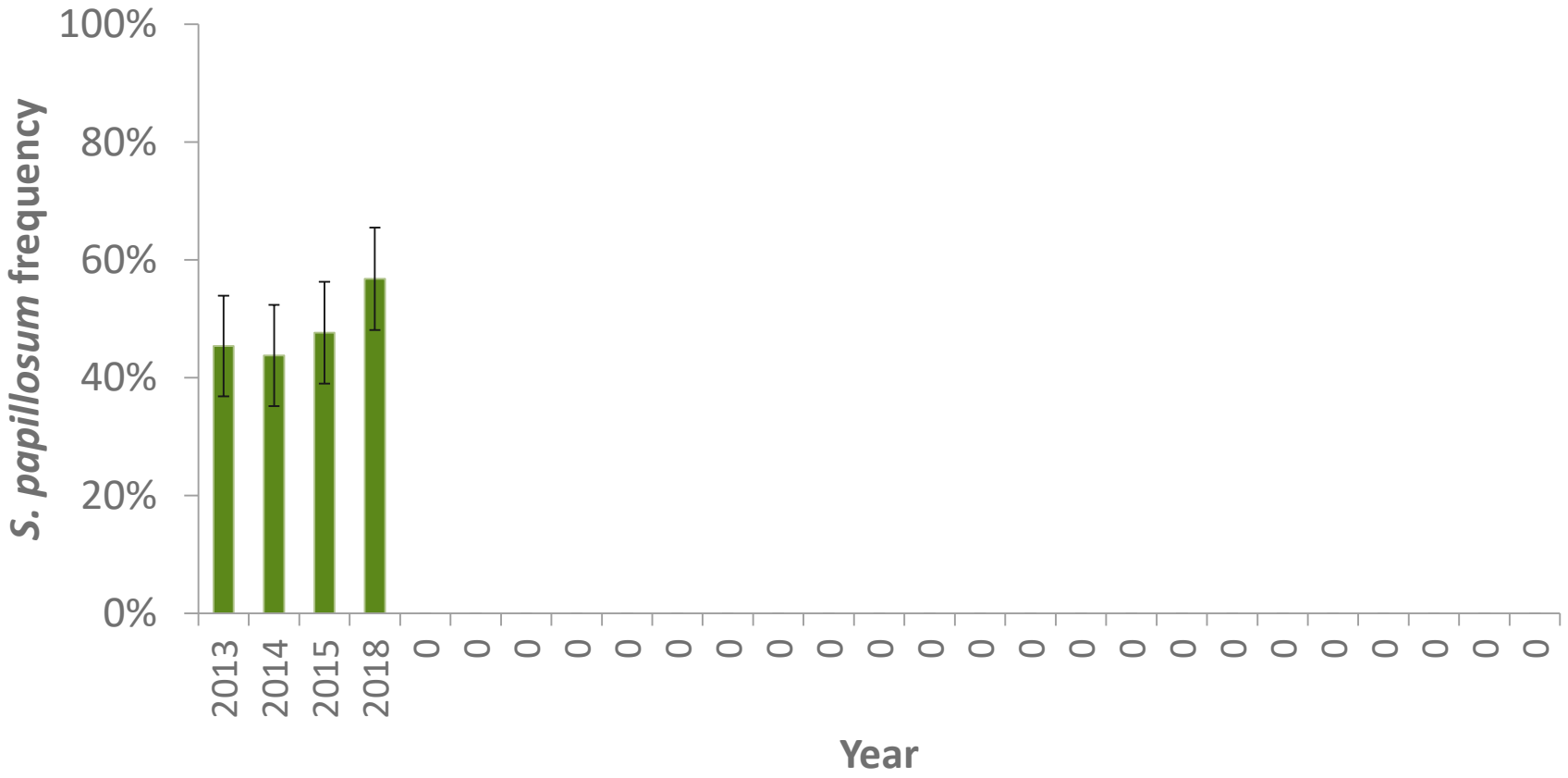
Devise Unbiased Sample Layout

- Stratify samples
- Random points vs systematic grid with random start point
- Macroplots vs whole site



Evaluate Changes

- Early assessment of change and direction of travel
- Permanent plots give greater confidence in mean result
- Be self-critical, challenge assumptions



Annual Assessment vs Objectives

Summary

- Be precise
- Test your ideas
- Plan for the long-term

<u>Further Reading</u>

Measuring and Monitoring Plant Populations (1998). Caryl L. Elzinga. US Bureau Land Management

Photo: blanket bog restoration 2 years post-intervention in a felled plantation