

Phosphate management & grass growth:

An introductory guide for Crofters

Why is phosphate important to grass growth?

Phosphate helps root development, tillering, feeding value and early growth. Soil P supply to the plant is dependent on soil reserves, which must be converted to a soluble form before being absorbed by plant roots. This guide will help you understand how the phosphate sorption capacity of your soil affects your grass productivity.

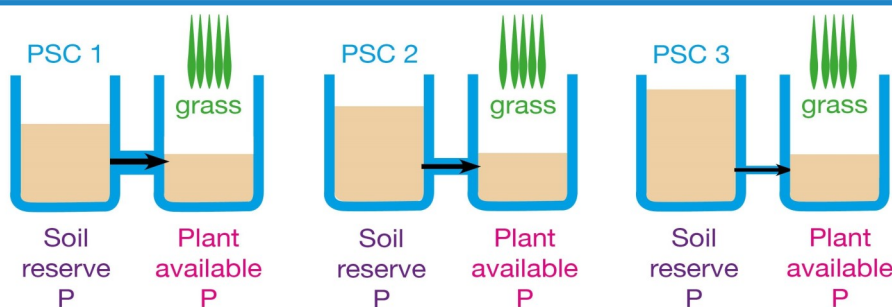
What is the problem?

- The soils in the West Highlands & Islands tend to have a very low or low P status and a pH below 5.5
- If soil pH is not corrected by liming in these soils yield potential is expected to be lower due to high phosphate sorption capacity of the soil and low extractable (available) plant phosphate.
- Loss of yield is more common in wetter, poorer drained upland areas because P availability is reduced at low temperatures, for example slower growth in early spring.



What is phosphate sorption capacity?

- Phosphate sorption is the ability of different soils types to bind available phosphate, inhibiting its uptake by growing plants.
- The P sorption capacity varies depending on soil chemistry, texture, pH and organic content of your soil.
- Phosphate sorption is measured in three indices 1, 2 & 3.
- Soils classed as PSC1 release phosphorus more readily than soils at PSC3
- See maps overleaf to identify the PSC index of your area.



This diagram visualises PSC index and plant available P with varying widths of pipes connecting them to illustrate the decreasing release of P from PSC1 to PSC 3.

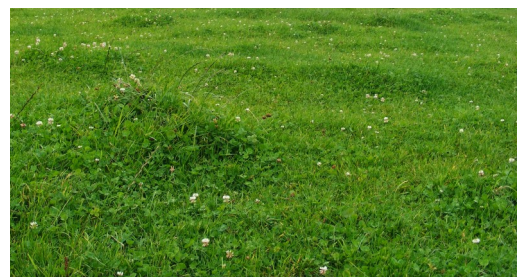
Source: [FFBC: Managing Soil Phosphorus](#)

In practice

- For example if your P sorption capacity is high and your P status of your soil is low or very low, then very little phosphate is available for grass growth—this would be the case of PSC index 3 (see below how to improve your plant available P). PSC index 3 soils need a higher application of P fertiliser before they release it to the soil.
- However, if your land is in PSC index 1 and your P status is moderate, then you should have enough plant available P in your soil and you need to replace the phosphate from the growing grass, considering the target pH.

Why is managing phosphate important?

- There is both a financial implication and an environmental implication of over applying phosphate.
- For environmental reasons we should avoid excess phosphate being washed into water courses causing pollution.
- If the P sorption capacity of your soil is high, it may not be worth applying high rates of P fertiliser as the yield benefit may not cover the cost of the fertiliser.
- However, it is especially important to get phosphate levels right if you are planning to establish new grass.



How can we improve plant available phosphate ?

- Get the basics right – soil sample every 4 to 5 years specifically to understand your pH and phosphate status
- Lime to target pH: Remember at low pH, phosphate will be less available to the plant!
- Cold soils also reduce availability, especially in early spring therefore drainage will help
- Aim to replace P offtake from your grass (especially from silage where no farm yard manure is returned to the field) to ensure you do not deplete your soil reserves. 80% of P is recycled in the dung and urine.
- Understand your Phosphate Sorption Capacity (PSC) of your soils and adjust fertiliser requirements accordingly.

For more detailed information regarding phosphate sorption we recommend to download the technical notes TN715, TN716 & TN 688 from the FAS website (www.fas.scot/publication/technical-notes/)

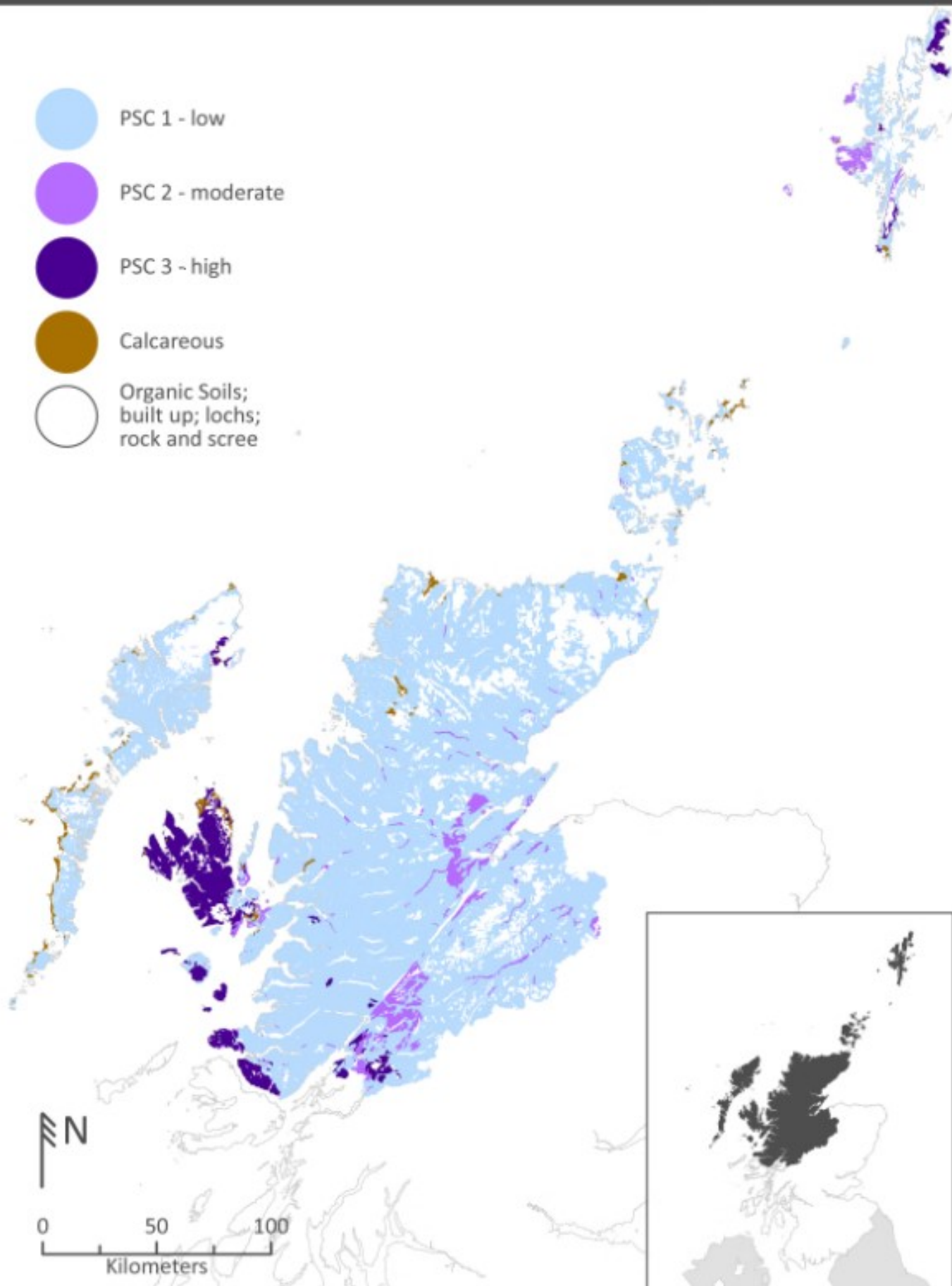
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PSC index - Highland and Islands

-  PSC 1 - low
-  PSC 2 - moderate
-  PSC 3 - high
-  Calcareous
-  Organic Soils; built up; lochs; rock and scree



PSC index - South West Scotland

