

Further explanation of LUC classification system as per commissioner's request.

Expanded from LUC review report.

Individual LUC units (where classes are further delineated into subclasses and units e.g. 3s2or 6e4) are developed based on the dominant limitation or where multiple limitations exist the following priority is observed: erodibility (e) > excessive wetness (w) > rooting zone limitations(s) > climate (c).

When allocating different units to blocks of land the following assumptions are made:

- The permanent physical limitations of the land remain.
- **The rectifiable limitations may be removed.**
- An above average level of land management is practiced.
- Appropriate soil conservation measures will be applied and maintained.

Physical limitations have three distinct categories:

- Permanent limitations that cannot be removed – examples of this type of limitation include climate, rock type, slope, and soil attributes where the ability to modify does not exist or is cost prohibitive.
- Removable limitations are those where the limitation can technically be removed but where it requires considerable effort and investment. E.g., soil wetness, flooding, gravel picking.
- Modifiable limitations are those that can be removed via ongoing investment and management. Examples include erosion, soil moisture deficits and nutrient deficiencies.

Therefore: Where LUC units have limitations that are considered removable or modifiable (e.g. wetness, nutrient deficiency, erosion) it is assumed that those limitations have already been removed when the unit is assessed. The exact wording from the LUC handbook<sup>1</sup> is as follows<sup>2</sup>

Where it is feasible to either remove or significantly reduce the physical limitation (e.g. installing drainage or permanent irrigation, improving soil fertility, removing surface gravel, stones or boulders, or minimising erosion), then the land is assessed as if the limitation has already been removed or managed. For example, stoney Kopua soils (Plate 79) may be classified as LUC 3s even before stone picking has taken place.

Clearly, the feasibility of removing limitations across every unit was not carried out for the entirety of each individual unit at the time of mapping (approx. 1980). As time has progressed and land holdings have become further fragmented or additional infrastructure has been developed (e.g., residential housing) the opportunity for removal of limitations has also changed. Where current technical and financial feasibility has conclusively shown that the removal or modification of a

<sup>1</sup> Lynn I, Manderson A, Page M, Harmsworth G, Eyles G, Douglas G, Mackay A, Newsome P 2009. Land Use Capability Survey Handbook - a New Zealand handbook for the classification of land. 3rd ed. Hamilton, AgResearch; Lincoln, Landcare Research; Lower Hutt, GNS Science [https://www.landcareresearch.co.nz/data/assets/pdf\\_file/0017/50048/luc\\_handbook.pdf](https://www.landcareresearch.co.nz/data/assets/pdf_file/0017/50048/luc_handbook.pdf)

<sup>2</sup> Stone removal or stone picking is a method of removing stones from the surface and shallow subsurface to facilitate cultivation practices.

limitation cannot be effectively or reliably implemented thereby limiting the lands' ability to be highly productive, there are two pathways to explore. Firstly, continue with an exception approach under the HPL NPS or secondly, reclassify the piece of land to reflect the reality of its limitation more correctly in a contemporary context. This may mean a unit of 3w1 should be more correctly assessed as class 4 or if the limitation is still too severe for arable use be assessed as class 6 (class 5 is generally reserved for the least limited pastoral units).

It should be noted that at regional scale (i.e., approx. 1:50 000) the smallest map unit is approximately the size of the old 1cent piece (1cm<sup>2</sup> or 25ha). This means that smaller areas within units may well have different degrees of limitation when compared to the unit as a whole and therefore different potentials/limitations when being assessed as highly productive land. Higher resolution mapping surveys (1:8000) may identify these areas and map them as separate (potentially different) units. At a scale of 1:8000 the smallest unit equates to approximately 0.7ha.

The handbook is clear that the "difficulty of removing or modifying limitations depends on their type and severity. The key words 'reasonable', 'feasible', and 'economic' are considered when deciding on the practicality of removing or modifying limitations."

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