

Defining Land Suitability for the HRWO Catchments

Chair, Technical Leaders Group, 29th May 2016

Purpose

To propose to the CSG a definition of land suitability that reflects the particularities of the Healthy Rivers/Wai Ora (HRWO) plan change and the desire of the CSG to signal how it intends a land suitability approach to be applied in the future.

Definition of land suitability

Land suitability is the 'fitness' of a given piece of land for a defined land use. The process of land suitability classification is the appraisal and grouping of specific areas of land in terms of their relative suitability for a defined use as determined by a specified set of diagnostic criteria. The basic outputs are typically maps and lists of land parcels ranked by suitability.

There are many versions of 'land suitability' in the literature - it is important to develop a locally-tailored definition of land suitability that reflects the intended application to which it will be put. For the purposes of signalling the intent of the CSG with respect to the HRWO Plan change the following definition and supporting description of Land Suitability is proposed:

HRWO Land Suitability is defined as the *intrinsic fitness* of a given piece of land for a defined land use. *Intrinsic fitness* is assessed using the following diagnostic criteria:

- the biophysical properties of the land that determine productive potential and susceptibility to contaminant loss (e.g., slope, soil type, drainage class, and geology);
- the local climate regime that determines likelihood of water shortage and runoff patterns (e.g., rainfall and its seasonal distribution);
- the natural capacity of the landscape to attenuate contaminant loss;
- the scenario 1 water quality limits related to nitrogen, phosphorus, *E.coli*, and sediment for the surface waters that the land is hydrologically connected to; and
- the desired values in those receiving waters (ecological and human health) and how they are influenced by the four contaminants.

For the avoidance of doubt, HRWO Land Suitability diagnostic criteria *exclude* current land use and current water quality, the moderating effects of potential mitigations, and non-biophysical criteria (economic, social, and cultural). Instead, these factors will be of importance in analysing the implications of a completed HRWO Land Suitability classification.

Because a HRWO Land Suitability classification will need to consider all four contaminants simultaneously, the schema for that classification will need to include a multi-criteria decision-making approach. Such an approach will derive the most optimal solution for these multiple contaminants that prioritises their local influence on the desired values and transparently describes any trade-offs made.

The Our Land and Water National Science Challenge, currently getting underway, has a programme to develop a nationally-applicable land suitability classification schema. In reading the information provided by the programme leader Dr Scott Larned (NIWA) it is apparent that this research will provide a suitable multi-criteria schema for application to the HRWO catchments using the locally-relevant diagnostic criteria described above.