Appendix A

The link between LSC (Life Supporting Capacity) class, values and standards – Panel question: why do we need the LSC class notation (ie. HSS) in Table Ba.10?

Aquatic communities are highly variable across the Region. This variability is a result of:

1. catchment geology;
2. position in the catchment (ie. upland vs. lowland);
3. adverse impacts from human activities; or
4. a combination of all of the above.

The purpose of the eight LSC classes is to account for this natural variability in determining what type of aquatic communities should be expected in different river environments, given their catchment geology and position.

For example, in the Lowland Sand (LS) Life Supporting Capacity class aquatic ecosystems are unlikely to have macroinvertebrate communities with an abundance of sensitive species such as mayflies, stoneflies or caddis flies, because the sandy stream bed material (sourced from the geology within the lower catchment) doesn't provide suitable habitat for these species. However, these sites can be expected to have a greater diversity of migratory native fish because of their lowland catchment position, closer to the coast.

By contrast, an Upland Volcanic Acidic (UVA) class river should have sensitive macroinvertebrates because of the hard river bed substrate and suitable habitat. Diversity of native fish will be reduced because migratory species have to travel much further inland from the sea to reach upland river habitats.

Having the LSC class notation within Table Ba.10 allows applicants, council officers and decision-makers a common frame of reference to identify the potential Life Supporting Capacity of aquatic ecosystems within a particular water management zone.

Although the water quality standards take the LSC class into account, there is potential within a consent process for the relevance of standards to be contested. In such circumstances, having the LSC class clearly stated within Schedule Ba allows an assessment of effects to occur against the background of realistic expectations for the Life Supporting Capacity of that water body.

For example, a submitter may argue that a more stringent toxicity % protection standard (ie. 99% rather than 95%) should be applied in a Lowland Sand (LS) water body for the protection of aquatic macroinvertebrates. Macroinvertebrates are likely to be less sensitive in this LSC class, so this may be an inappropriate argument (unless the native fish communities warrant a greater level of protection).

Panel question: how specific should the SIN standard be (ie. should we round the 0.444 g/m^3) and how does this relate to the ANZECC nitrogen standard?

The common analytical level of detection for the nitrogen species which contribute to SIN are 0.005 g/m^3 for ammoniacal-N and 0.002 g/m^3 for nitrate and nitrite. Thus, analytical methods largely allow for assessment of data against a standard that is specific. Because the standard is an annual average, specificity is appropriately dealt with in determining the average.

With regards to nitrogen, the ANZECC (2000) Guideline specifies a total oxidised nitrogen (NOx) trigger value of 0.444 g/m^3 for lowland rivers (Table 3.3.10, page 3.3-17). SIN is a product of NOx *and* ammoniacal-N (which has an ANZECC trigger value of 0.021 g/m^3 for lowland rivers). By including both the NOx and ammoniacal-N components in the 0.444 g/m^3 SIN value, the POP SIN standard is slightly more conservative than the guideline. If both trigger values from ANZECC were applied in combination, the SIN 'guideline' would be 0.465 g/m^3.