Summary Lake Typology

1. Summary Lake Typology

The Water Framework Directive (WFD, or the Directive) requires Member States to identify the location and boundaries of bodies of surface water and to carry out an initial characterisation of all such bodies (Annex II). The surface water bodies identified must be differentiated according to hydromorphological type. These types are those defined using either 'System A' or 'System B' in Annex II.

Northern Ireland (NI) adopted System A in deriving the basic typology of lakes, as summarised in Table 1. It is anticipated in Ecoregion 17 (island of Ireland) that this typology will be further developed, when the data become available, into a System B typology using mean depth and alkalinity. This System B will be compared with System A typology to ensure both its ecological relevance and its usefulness as a water quality management tool.

Table 1: WFD lakes typology – System A

Fixed typology	**Descriptors**
Ecoregion	Ecoregions shown on map A in Annex XI
	Altitude typology High: >800m Mid-altitude: 200 to 800m Lowland: <200m Depth typology based on mean depth <3m 3 to 15m >15m Size typology based on surface area 0.5 to 1 km^2 1 to 10 km^2 10 to 100 km^2 > 100 km^2 Geology Calcareous Siliceous Organic

The NI typology (Table 2) generates eight theoretical lake types, although, in practice, some of these do not exist or are not populated. This System A typology when applied to Northern Ireland lakes > 50 ha produces a typology map with five lake types (see Map 5, Characterisation Summary Report[1]).

Table 2: Lakes typology - System A

Typology based on system A	**Bands**
Altitude	Low < 200m Mid-Altitude 200-800m
Depth	3 – 15m
Size	> 50 ha
Geology	Calcareous – peat Calcareous – non-peat Siliceous – peat Siliceous – non-peat

The above system bandings have been adopted for a number of reasons:

- There are no lakes in NI above 800m altitude.
- At present in NI, there is insufficient information on mean and maximum lake depth. Therefore it has been assumed (expert opinion) that the majority of lakes are within the mean depth range 3 – 15 m.
- WFD characterisation requires reporting on all lakes > 50 ha.
- Dominant geology (siliceous / calcareous / organic) was used in the NI River Typology System A. Although this was considered for lakes, it was decided that, because off residence times in lakes, it would be more ecologically relevant to classify solid geology with organic influence.

2. Construction of typology maps:

The construction of the typology maps was carried out using ArcView Geographical Information Systems (GIS). The following data inputs were required:

- OSNI panorama (Digital Elevation Model or DEM)
- GSNI solid geology dataset 1:250,000, GSNI drift geology 1:250,000
- Lakes.shp file for Northern Ireland.

The lake catchments were generated automatically on GIS (Geographical Information Systems) using a script supplied by Department of Agriculture and Rural Development (DARD). The catchments were checked hydrologically and any corrections made manually on GIS.

The waterbodies were reviewed using European guidance on identification of waterbodies and some of the lakes have been divided into smaller separate waterbodies.

[1] http://www.ehsni.gov.uk/pubs/publications/article5report.pdf

In the case of Lower Lough Erne division was due to morphological considerations. The Western end of the Lough is a large deep trough, whereas the eastern end is long and relatively shallow.

In the case of Lough Neagh the reason for division originates from the Water Framework Directive Common Implementation Strategy (CIS) Guidance on the identification of water bodies which recommends the following:

'A discrete element of surface water should not contain elements of different status. A water body must be capable of being assigned to a single ecological status class with sufficient confidence and precision through the Directive's monitoring programmes.'

EHS undertook a littoral invertebrate survey of Lough Neagh in 1998 which identified differences in the benthic invertebrate communities around the lough shoreline. In light of this, EHS decided, as a precautionary measure (given the CIS guidance quoted above), to split Lough Neagh into the three water bodies indicated. It was decided that a pressures and impact assessment of the three separate water bodies in Lough Neagh would help in assessing with greater confidence the status of the lake as a whole.

These water bodies have therefore been assessed separately in the initial Article 5 characterisation process. EHS is now reviewing this information to decide whether there is scientific justification for the three separate waterbodies or whether Lough Neagh should be assessed as a single unit (or split in some other way) for WFD purposes.