# Northern Ireland Lake Typology

As part of the 2005 Article 5. WFD Characterisation Technical Report, Member States were required to identify the location and boundaries of bodies of surface water and to carry out an initial characterisation of all such bodies. The surface water bodies identified then had to be differentiated according to type as defined using either 'System A' or 'System B' in Annex II.

Northern Ireland defined an initial lake reporting typology based on System A of Section 1.2 of Annex II of the Water Framework Directive using the typology descriptors in Table 1.

### Table 1: System A Descriptors

| | |
|---|---|
| **Altitude typology** | High: >800m<br>Mid-altitude: 200 to 800m<br>Lowland: <200m |
| **Depth typology based on mean depth** | <3m<br>3 to 15m<br>>15m |
| **Size typology based on surface area** | 0.5 to 1 km2<br>1 to 10 km2<br>10 to 100 km2<br>> 100 km2 |
| **Geology** | Calcareous<br>Siliceous<br>Organic |

When applying these descriptors to NI lakes the following points were considered

There are no lakes in NI above 800m altitude.

In 2005 there was insufficient information on mean and maximum lake depth. Therefore it was assumed (based on expert opinion) that the majority of lakes were within the mean depth range 3 – 15 m.

Dominant geology (siliceous / calcareous / organic) was used in the NI River Typology System. Although this was considered for lakes, it was decided that, because of residence times in lakes, it would be more ecologically relevant to classify solid geology with organic influence.

This led to the creation of 24 NI types as described in Table 2 with 8 lake types for the surveillance lakes (>50ha).

**Table2: A summary of System A typology for lakes Northern Ireland 2005**

| Altitude | Calcareous /Siliceous | Size of Lake | Peat/Nonpeat | TYPE |
|---|---|---|---|---|
| <200m | Calcareous | <10 ha | Nonpeat | 1 |
| | | | Peat | 2 |
| | | 10 – 50 ha | Nonpeat | 3 |
| | | | Peat | 4 |
| | | >50 ha | Nonpeat | 5 |
| | | | Peat | 6 |
| | Siliceous | <10 ha | Nonpeat | 7 |
| | | | Peat | 8 |
| | | 10 – 50 ha | Nonpeat | 9 |
| | | | Peat | 10 |
| | | >50 ha | Nonpeat | 11 |
| | | | Peat | 12 |
| >200m | Calcareous | <10 ha | Nonpeat | 13 |
| | | | Peat | 14 |
| | | 10 – 50 ha | Nonpeat | 15 |
| | | | Peat | 16 |
| | | >50 ha | Nonpeat | 17 |
| | | | Peat | 18 |
| | Siliceous | <10 ha | Nonpeat | 19 |
| | | | Peat | 20 |
| | | 10 – 50 ha | Nonpeat | 21 |
| | | | Peat | 22 |
| | | >50 ha | Nonpeat | 23 |
| | | | Peat | 24 |

## Refined Northern Ireland Typology 2012

When this initial typology was defined in 2005 it was with the expectation that "*this typology will be developed further thus ensuring its ecological relevance and increase its utility as a water quality management tool. It is anticipated in Ecoregion 17 that this typology will be further developed, when the data become available, into a System B typology using mean depth and alkalinity"*

## Lake Typology GB

Lake typology for Great Britain (Ecoregion 18) followed the System B approach as specified in the Water Framework Directive. This was based on altitude, latitude, longitude, depth, geology and size. Of these catchment geology and lake depth were believed to be the most important in explaining the natural variation of ecological conditions in lakes. Within the context of Great Britain, geographic location (latitude and longitude) and lake size were not considered sufficiently variable to warrant sub-types and altitude was considered a minor factor. Thus a "core typology" based on alkalinity and mean lake depth was created. . All the biological assessment tools developed in the UK use these parameters, whilst some additionally use lake area, drift geology, perimeter length and colour to provide better explanation for site-specific variability

As Northern Ireland follows UK TAG guidance and applies assessment tools and standards developed for the UK, NI has now refined its typology in line with UK typology.

Lake Depth is an important influencing factor on lake processes and ecological response to pressure. Bathymetry surveys and increased monitoring data mean we now have accurate depth data for all our surveillance lakes. The banding for lakes is divided into Very Shallow, Shallow and Deep.

Alkalinity is considered to be a surrogate for geology and three bands of Low Moderate and High Alkalinity have been adopted.

A summary of the new typology descriptors for lakes in Northern Ireland is provided in Table 3

### Table 3: System B typology for lakes in Northern Ireland

| **Descriptor** | **Bandings** |
|---|---|
| **Depth** | **Very Shallow< 3m**<br>**Shallow 3-15m**<br>**Deep>15m** |
| **Alkalinity** | **Low Alkalinity < 10mg CaCo3**<br>**Moderate Alkalinity 10 – 50 mg CaCO3**<br>**High Alkalinity > 50mg CaCo3** |

This generates the 9 lake types as described in table 4 below.

### Table 4: Northern Ireland Lake types 2012

| Lake Type | Alkalinity (mg CaCo3) | Depth (m) |
|---|---|---|
| Low Alkalinity Very Shallow | <10 | <3 |
| Low Alkalinity Shallow | <10 | 3-15 |
| Low Alkalinity Deep | <10 | >15 |
| Moderate Alkalinity Very Shallow | 10-50 | <3 |
| Moderate Alkalinity Shallow | 10-50 | 3-15 |
| Moderate Alkalinity Deep | 10-50 | >15 |
| High Alkalinity Very Shallow | >50 | <3 |
| High Alkalinity Shallow | >50 | 3-15 |
| High Alkalinity Deep | >50 | >15 |

The UK were involved in the intercalibration process through the Northern and Central Baltic Geographic Intercalibration Groups (GIGs). The GIG types are described in Tables 5 and 6

### Table 5: Northern GIG lake types

| *Type* | *Lake characterisation* | *Altitude & geomorphology* | *Mean depth (m)* | *Geology alkalinity (meq/l)* | *Geology alkalinity (mg/l CACO3)* | *Colour (mg Pt/l)* | *Lake size ($km^2$)* |
|---|---|---|---|---|---|---|---|
| ***L-N1*** | *Lowland, shallow, siliceous (moderate alkalinity) clear, large* | < 200 m or HC* | 3-15 | 0.2 - 1 | 10-50 | < 30 | > 0.5** |
| ***L-N2a*** | *Lowland, shallow, siliceous (low alkalinity) clear, large* | < 200 m and HC | 3-15 | < 0.2 | <10 | < 30 | > 0.5 |
| ***L-N2b*** | *Lowland, deep, siliceous (low alkalinity) clear, large* | < 200 m and HC | >15 | < 0.2 | <10 | < 30 | > 0.5 |
| ***L-N3*** | *Lowland, shallow, siliceous (low alkalinit), organic (humic) large* | < 200 m and HC | 3-15 | < 0.2 | <10 | > 30 | > 0.5 |
| ***L-N5*** | *Mid-altitude, shallow, siliceous (low alkalinity) clear, large* | Between lowland and highland | 3-15 | < 0.2 | <10 | < 30 | > 0.5*** |
| ***L-N6*** | *Mid-altitude, shallow siliceous (low alkalinity), organic (humic) large* | Between lowland and highland | 3-15 | < 0.2 | <10 | > 30 | > 0.5** |
| ***L-N8*** | *Lowland, shallow, siliceous (moderate alkalinity), organic (humic), large* | < 200 m or HC | 3-15 | 0.2 - 1 | 10-50 | > 30 | > 0.5 |

**Table 6:Central Baltic GIG types**

| *Type* | *Lake characterisation* | *Altitude & geo-morphology* | *Mean depth (m)* | *Geology alkalinity (meq/l)* |
|---|---|---|---|---|
| ***L-CB1*** | *Lowland, shallow, **stratified**, calcareous* | < 200 | 3 - 15 | > 1 |
| ***L-CB2*** | *Lowland, very shallow, calcareous,* | < 200 | < 3 | > 1 |
| ***L-CB3*** | *Lowland, shallow , siliceous, vegetation dominated by Lobelia* | < 200 | < 15 | 0.2 - 1 |

These GIG types are important as Northern Ireland must adopt the relevant GIG EQRS for biological elements.

The typology for Northern Ireland lake types and their corresponding GIG types are given in Table 7

**Table 7: Lake Types and GIG types**

| **Lake Type** | **GIG type** |
|---|---|
| Low Alkalinity Very Shallow | None |
| Low Alkalinity Shallow | L-N2a,L-N3, L-N5, L-N6 |
| Low Alkalinity Deep | LN2b |
| Moderate Alkalinity Very Shallow | L-CB3 |
| Moderate Alkalinity Shallow | L-N1, L-N8, L-CB3 |
| Moderate Alkalinity Deep | None |
| High Alkalinity Very Shallow | L-CB2 |
| High Alkalinity Shallow | L-CB1 |
| High Alkalinity Deep | None |