River Basin Management Plans 2015 - 2021

Changes to Heavily Modified Water Body Lakes

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Review of Lake Heavily Modified Waterbody (HMWB) Designation and Classification

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This paper sets out the approach to designation and classification of Heavily Modified Waterbodies in the First River Basin Planning Cycle and the changes that will be made in the Second River Basin Planning Cycle.

First River Basin Planning Cycle

In accordance with Article 4 of the WFD, member states are permitted to identify surface water bodies where the physical structure has been changed for a specific use and designate them as heavily modified water bodies (HMWB). HMWBs are bodies of water which, as a result of physical alterations by human activity, are substantially changed in character and therefore cannot meet Good Ecological Status (GES.) Instead of GES, these water courses must meet "Good Ecological Potential" (GEP).

Ecological Potential measures the water quality achievable given the constraints imposed by the modified, physical characteristics necessary for the use of or for the protection of the wider environment. The objective for a HMWB is to achieve GEP except where technically infeasible or disproportionately expensive.

Designation

In 2005 a desktop study was carried out to identify potential heavily modified water bodies (pHMWB) for the Article 5 Characterisation process using GIS maps and aerial photography. A screening risk assessment process was then adopted using threshold criteria to assess the significance of morphological pressures on the pHMWB. In 2007, it was decided to use the SEPA Rapid Designation approach to confirm the final designations given the lack of knowledge on morphological/ecological links and the timeframe involved. This approach was endorsed by the UKTAG. If restoration measures could be taken to achieve GES, without impacting on the specified use of the water body or the wider environment, then it was removed from the pHMWB list. However if making hydromorphological alterations to achieve GES would have a significant adverse effect, then the water body was designated as a HMWB without the need for further investigation. This led to 12 lakes being designated as HMWBs Table 1 below.

Table 1 : List of Lake HMWBs first river basin planning cycle

LAKE NAME	Reason for designation
Beg	Water Regulation
Cam	Drinking Water Storage
Castlehume	Water Regulation
Fea	Drinking Water Storage
Lough Island Reavy	Drinking Water Storage
Lower Lough Erne (Devenish and Kesh)	Water Regulation
Upper Lough Erne	Water Regulation
Mourne	Drinking Water Storage
Neagh	Water Regulation
Silent Valley	Drinking Water Storage and wider environment
Spelga	Drinking Water Storage
Stoneyford	Drinking Water Storage

Mitigation

UKTAG produced a guidance document in March 2008 on assessing the ecological potential of HMWBs based upon the use of generic checklists known as the 'Alternative Approach'. The checklists describe mitigation measures that can be used as a way of assessing whether more can be done to increase the ecological potential of a water body. The UKTAG mitigation measures approach was adopted by NIEA to assess ecological potential for each designated HMWB. Where all mitigation measures for the water use were considered to be in place *Good Ecological Potential or better* was the classification. Where all mitigation measures for the water use are not in place *Moderate Ecological Potential or worse* was assigned.

All NIEA lake HMWBs have been altered by managing their water level regimes for water supply, hydroelectric power or flood control, and therefore the mitigation measures listed in

ANNEX II (Water Storage and Supply) of the UKTAG guidance were deemed the most appropriate. A workshop was held with stakeholder representatives and the outcome of the workshop was that the ecological potential of lake HMWBs were assessed as detailed in the table below. If the Ecological potential was assessed as MEP or worse the reason for this assessment is also provided in the table.

Table 2 : Mitigation assessment of lake HMWB for first river basin planning cycle

LAKE NAME	Reason for designation	Potential following Mitigation approach	Reason if Mitigation approach shows less than Good
Beg	Water Regulation	GEP	
Cam	Drinking Water Storage	MEP	Sediment and flows downstream
Castlehume	HEP and Flood Risk Management (Water Regulation)	GEP	
Fea	Drinking Water Storage	GEP	
Lough Island Reavy	Drinking Water Storage	MEP	Sediment flows and DO downstream
Lower Lough Erne (Devenish and Kesh)	HEP and Flood Risk Management (Water Regulation)	MEP	Fish passability and Level regime
Upper Lough Erne	Water Regulation	MEP	Fish passability and Level regime
Mourne	Drinking Water Storage	MEP	Fish passability, sediment and flows downstream
Neagh	Water Regulation	GEP	
Silent Valley	Drinking Water Storage and wider environment	MEP	Flows downstream
Spelga	Drinking Water Storage	MEP	Sediment and flows downstream
Stoneyford	Drinking Water Storage	MEP	Sediment and flows downstream

Classification

Following the mitigation measures approach, physicochemical standards and biological classification tools were used to assess whether there are water quality problems in the HMWBs that are not associated with the hydromorphological pressure. The UKTAG Guidance on the Classification of Ecological Potential for Heavily Modified and Artificial Waterbodies (March 2008) recommended that macrophytes and fish are not included in overall status assessments because they are more likely to respond to the hydromorphological pressure.

The 2013 overall classification of ecological potential for HMWB lakes is given in the table below. The elements responsible for assessing the lake to be at less than Good status are also outlined in the table below.

Table 3: Classification of lake HMWB for first river basin planning cycle

LAKE NAME	2013 overall ecological potential	Driver for potential less than good
Beg	Poor	Phytoplankton Diatoms TP
Cam	Moderate	Phytoplankton TP
Castlehume	Good	
Fea	Good	
Lough Island Reavy	Moderate	Specific pollutants
Lower Lough Erne (Devenish and Kesh)	Moderate	Phytoplankton Diatoms TP
Upper Lough Erne	Moderate	Phytoplankton Diatoms TP
Mourne	Poor	Phytoplankton Diatoms TP
Neagh	Bad	Phytoplankton Diatoms TP
Silent Valley	Moderate	Mitigation approach
Spelga	Moderate	Mitigation Approach
Stoneyford	Poor	Phytoplankton and Diatoms

Second River Basin Planning Cycle

Designation

UKTAG guidance states that "In order for a water body to be designated heavily modified, evidence is required to show that the water body would not achieve good status without measures being applied in relation to the modifications that have been made to the hydromorphological characteristics". This would suggest that to be designated as heavily modified we would need evidence that a waterbody cannot achieve good status because it is impacted by a hydromorphological pressure.

Since lake HMWBs were designated, Lake Habitat surveys have been carried out at all lakes and they have been classified using lake MImAS and hydrology standards. The 2013 hydrology and morphology classifications for lake HMWBs are given in the table below

Table 4: Hydrology and morphology classifications for lake HMWBs

Lake Name	Hydrology	Morphology (MImAS)
Beg	Good	High
Cam	Less than Good	Fail
Castlehume	Good	Fail
Fea	Less than Good	Fail
Lough Island Reavy	Less than Good	Fail
Lower Lough Erne	Good	Fail
Upper Lough Erne	Good	Fail
Mourne	Less than Good	Fail
Neagh	Good	Fail
Silent Valley	Less than Good	Fail
Spelga	Less than Good	Fail
Stoneyford	Good	Fail

These hydrology and morphology classifications should be considered when designating a lake waterbody as Heavily Modified now this additional evidence is available.

Lough Beg and Portmore Lough

Lough Beg was designated a HMWB for Water Regulation.

The hydrological regime of Lough Beg is a balance between the inflow at Toome and the outlet at Portna which is controlled by Rivers Agency who maintains and operate the sluices. It is relatively shallow (max 2m deep) with the exception of the dredged navigation channel (up to 4m deep but only 1.2m or less for extended lengths.).

Lough Beg passes both hydrology and MImAS standards and its hydromorphology is therefore assessed as "Good". This would suggest that Lough Beg is not impacted by a hydromorphological pressure. Using the mitigation approach Lough Beg was assessed as being at GEP.

Portmore Lough was identified as a pHMWB but was not designated for the first RBC. It was assessed as being at good hydromorphological condition and therefore it was decided not to continue with the HMWB designation

Portmore also has connectivity to Lough Neagh. The outlet of Portmore is channelised but there are no control structures in place. This means a change in level has occurred historically, but no further management takes place. Active controls are in place on Lough Neagh and these will indirectly influence the levels on the Tunney Cutt and possibly Portmore. If Lough Neagh is drawn down or raised, the levels in the Cutt will adjust accordingly. However given the fetch on Lough Neagh, water levels within the lake are also altered by wind induced seiches with water flowing upstream into the influent rivers and into Portmore Lough.

Lough Beg and Portmore Lough are both assessed as "Good" for hydrology and morphology standards and the main pressures on these lakes are nutrient levels. The pressures on both lakes are similar and the same considerations for designation need to be applied.

Lough Beg will be removed from the list of designated HMWBs as hydromorphology is not a determining factor in its capacity to achieve ecological status

Castlehume Lough

Castlehume was designated a HMWB for water regulation as it has direct connectivity to Lower Lough Erne via a natural channel and it was therefore assumed to be impacted by the water level controls on the main lake. Castlehume was also lowered as a result of the Lough Erne drainage and the Ballyshannon HEP schemes altering its natural water level regime.
At the mitigation workshop it was agreed that the main ecological impact occurred when the water level was lowered and resulted in the loss of wetland habitats. The water level is now controlled and the mitigation measures currently in place were considered adequate. Using the mitigation approach, Castlehume was therefore assessed as being at GEP.
Castlehume has been assessed as Good for Hydrology but fails its MImAS because of recreational pressure, loss of riparian vegetation, land claim and hard bank engineering. Castlehume does have a significant hydromorphological pressure but this is due to the pressures associated with the hotel and golf course. The reason for designation i.e. active water regulation is not considered to be a pressure

Castlehume will be dedesignated and its ecological status assessed

Stoneyford Reservoir

Stoneyford was originally designated a HMWB for water storage. When it was decommissioned by NIW it was de-designated as the designated use was no longer applicable. However the lake has a 12m impoundment which would have a clear hydromorphological pressure and Stoneyford is less than Good status for hydromorphology

Stoneyford will retain designation as a HMWB with its designation and associated mitigation measures being for the "Wider Environment"

Mitigation

The research projects that produced the mitigation measures checklists were mostly focused on rivers and therefore the mitigation measures that are listed focus on the impacts on the downstream river and not on the lake HMWB itself. Whether all mitigation measures were in place or not was also a matter of expert opinion, including the limited scientific evidence where available. Some assumptions were used to decide if the modifications would cause a significant adverse impact on the water environment. For example, in the absence of any assessments it was assumed that there was a morphological impact downstream of an impoundment. The UKTAG report recommends effectiveness monitoring similar to the programme of HMWB projects undertaken to date to refine and develop the mitigation measures checklist.

Silent Valley and Spelga Dam

Silent Valley and Spelga Dam were both assessed as being at MEP at the mitigation workshop. It was determined that the impoundments were likely to have an adverse impact on the downstream river flows and on the morphology characteristics of the downstream river. All biological and physicochemical elements included in the overall classification are at high or good status so the mitigation approach alone is the driver for less than Good status in these two lakes.

The mitigation outcome does not reflect the ecological potential of these Lake HMWBs and will therefore not be included in overall classification. The mitigation measures still need to be applied to the lake element to allow the river element to achieve GEP.

Classification

Classification tools have all been developed to detect the impact of eutrophication pressures and work is ongoing looking at the linkages between hydromorphology and ecology. In addition the impact of multiple stressors is not well understood where both nutrient and hydromorphological pressures are impacting on a lake.

As per UKTAG guidance, macrophyte status is not included in the overall status assessment of a HMWB. However this can mask, a nutrient pressure that may be impacting on the lake water quality in addition to a hydromorphological pressure. For example the macrophyte classification for Spelga Dam in 2006 was "Bad" in 2009 "Poor" and in 2012 "Moderate". Examination of the underlying metrics and raw data found that the Less than Good macrophyte status was due to the presence of filamentous algae and other nutrient tolerant species. It may be that water level fluctuations mean the lake does not support the necessary habitat to allow a natural macrophyte community to grow and therefore the HMWB will react more to increased nutrients than a natural lake.

Macrophyte status will not be included in overall classification if a HMWB fails its hydrology standards but will be flagged in a Weight of Evidence approach where it indicates a pressure in addition to the hydromorphological pressure.

Hydrology assessment is based on the naturalness of the habitable zone for macrophytes so good hydrology should not be a limiting factor for macrophyte growth. Upper Lough Erne is "Good" status for hydrology but when surveyed in 2010 it had excessive growths of *Elodea nuttelli* resulting in a macrophyte status of "Poor". However the overall classification for this waterbody was reported as "Moderate" which ignored the macrophyte status which indicated a eutrophication pressure.

If a Lake passes its hydrology standards macrophytes will be included in overall status assessments

Recommendations

This review has set out the justification for changes to lake HMWB designations, and records the outworkings of applying the recommended mitigation measures approach and classification guidance for HMWBs as adopted in Northern Ireland. As a result, the list of Lake HMWBs for second river basin planning cycle is presented in Table 5.

Table 5 : Final list of HMWBs for second river basin planning cycle with reason for designation

LAKE NAME	Reason for designation
Cam	Drinking Water Storage
Fea	Drinking Water Storage
Lough Island Reavy	Drinking Water Storage
Lower Lough Erne (Devenish and Kesh)	Water Regulation
Upper Lough Erne	Water Regulation
Mourne	Drinking Water Storage
Neagh	Water Regulation
Silent Valley	Drinking Water Storage
Spelga	Drinking Water Storage
Stoneyford	Wider Environment