Northern Ireland
Environment Agency

River Basin Management Plans

Programme of measures

Key Sectors — Water Supply, Industry, Agriculture and flood control

Pressure Type — Abstraction and Flow Regulation

www.ni-environment.gov.uk
Northern Ireland Environment Agency

Introduction

Abstraction refers to the process where water is removed from a surface water or groundwater body, either permanently or temporarily (for example, water can be temporarily diverted and then returned elsewhere within the same system). Abstraction of water can be by a number of means such as pumping, piping, diverting water into a reservoir, or by sinking a borehole or well. In Northern Ireland we abstract water for public drinking water supply, industrial use, use in the food and drink industry, hydro-power generation, agricultural and agri-industry use, recreational use (such as golf courses) and for use in fisheries.

In Northern Ireland, 99% of the drinking water supply is provided by Northern Ireland Water (formerly Water Service). Approximately 786,000 domestic and commercial properties in Northern Ireland are connected to the public water supply and each day Northern Ireland Water supplies (NIW) approximately 625 million litres of drinking water to customers. The main sources of this public water supply are reservoirs (48%) and loughs (40%). Rivers and groundwater each supply 6%. Rising demand (due to population growth) and the impact of climate change may mean that some areas will experience a reduction in the available water resource in the future.

The Water Framework Directive (WFD) requires Member States to ensure that the hydrological condition of surface waters supports the ecology. We have classified our surface waters for hydrology, however hydrological quality elements only contribute to status classification for water bodies at high ecological status (i.e. if a water body is at high status for biological and physico-chemical elements a hydrological impact can only cause it to be downgraded to good ecological status). Water resource flow standards for rivers, lakes and estuaries have been developed by the UK Technical Advisory Group (UKTAG). These are limits aimed at ensuring that water resource activities do not cause or contribute to the failure of WFD ecological status objectives. These standards have been set for each status class on the basis of the best available information on ecological impacts as recommended by UKTAG. We have used these standards to classify the hydrological status of our rivers and lakes. In order to assess whether a standard has been exceeded, we undertake water balance calculations, this includes both known abstractions and discharges, to determine the degree of change from natural river flows or lake levels.

In the case of groundwater, the surface water standards are also used for determining whether groundwater abstraction is sustainable where there is a connection between groundwater and surface waters. In addition consideration is also taken of the overall level of abstraction compared with how much water is replenishing the groundwater body, the effect of abstraction on nearby dependent ecosystems and whether saline intrusion is occurring.

In Northern Ireland 7% of our rivers and 45% of our lakes are classified as less than good hydrological status due to changes to water levels and flow. Of those at less than good hydrological status, 87% of rivers and 72% of lakes are affected by abstraction and flow regulation for public water supply with the remaining 13% of rivers and 27% of lakes affected by a range of impacts including flood control and manufacturing industries. For some surface water bodies, abstraction of groundwater within the catchment, which reduces base flow to the surface water body, can be a contributory factor to the failure.

The main issues identified for groundwater bodies relate to local impacts on dependent river water bodies and overall balance between abstraction and recharge.


Ballymorran

Heavily Modified Water Bodies

In some areas rivers and lakes have been altered to such a degree that attempting to return them to a natural condition would now be economically or technically infeasible. Such water bodies have been designated as Heavily Modified Water Bodies (HMWBs). Instead of "Good Ecological Status" (GES), the environmental objective for HMWBs is 'Good Ecological Potential' (GEP), which has to be achieved by 2015 unless alternative objectives have been set. Some of these HMWBs have been designated because they have a specified use for drinking water storage for public supply. These designated water bodies will require mitigation measures that maximise their ecological potential, as opposed to 'restoring' the natural condition.

In Northern Ireland 4% of river water bodies and 30% of lakes water bodies have been designated as HMWB for the purpose of public water supply.

NIEA held a series of workshops with relevant agencies and stakeholders to define ecological potential of the designated HMWBs. A technique was used to determine ecological potential based on whether all possible mitigation measures were in place in a water body. For example, where all mitigation measures for the water use were in place GEP or better was assigned. Where all mitigation measures for the water use were not in place 'Moderate Ecological Potential' (MEP) or worse was assigned. More information on the process that was used to assess whether a water body was heavily modified and how ecological potential was defined can be found on the *Quality of Our Water Environment* section of the NIEA website.

Spelga Dam

What causes the environmental impact?

Over abstraction or changes in flow regulation within a water body may lead to a reduction of water levels in rivers, lakes, wetlands and wells. This can lead to increased risk of pollution through reduced dilution and stress or mortality of fish and/or invertebrates. Over abstraction of water can result in making water supplies unsustainable and can have a negative impact on aquatic plants and animals and wetland areas. In extreme cases rivers beds may dry up, lake shores can become exposed and high levels of groundwater abstraction can draw polluted or saline water into aquifers compromising their long-term use. Stable flows below some dams may lead to sedimentation of fish spawning areas which are no longer cleaned out by spates.

Impoundment structures associated with abstraction activities such as weirs and dams can cause environmental impacts by causing barriers to fish passage. A number of fish species, including trout, salmon, eels and lamprey migrate along rivers to and from the sea as part of their natural breeding ecology. These species have evolved to be able to travel over small structures in the water, such as rocks, but larger structures can block their passage. Sometimes this occurs naturally due to features such as waterfalls, but many barriers are man-made. A poorly designed or managed impoundment can also prevent sediment movement down river systems and cause build up of sediment leading to changes to the river bed habitat.

Heavily Modified Water Bodies

Key legislation

Water Abstraction and Impoundment (Licensing) Regulations (NI) 2006

Article 11 of the Water Framework Directive (WFD) requires that the Programme of Measures established by river basin plans should include controls over abstractions and impoundments. Requirements in Article 6 of the Habitats Directive also require member states to have a formal or legal method of assessing the potential impact of abstraction/ impoundments on protected and sensitive sites. As a result of these requirements the Department of the Environment (DOE) introduced the Water Abstraction and Impoundment (Licensing) Regulations (NI) in 2006. These regulations aim to provide a single and consistent environmental risk based approach to the assessment and authorisation of water abstraction and impoundment activities within Northern Ireland.

Small scale activities with abstraction volumes less than 10m^3 per day are not required to notify NIEA but must adhere to Permitted Controlled Activities (PCA) conditions ensuring that:

- there is a means of measuring the volume abstracted;
- water leakage shall be kept to a minimum;
- the activity will cause no contamination or pollution; and
- abstraction from a borehole for the purpose of testing the hydraulic properties of an aquifer or testing water quality is allowed, providing the total volume abstracted is less than 150m^3 in any period of one year.

Operators with abstraction volumes between 10m^3 and 20m^3 per day must notify NIEA of the location of the activity and show compliance to the PCA. Abstraction volumes greater than 20m3 per day require a formal licence from NIEA which may stipulate conditions.

Under these regulations all hydroelectric schemes require a license to abstract water. NIEA consult externally with Northern Ireland Water, Loughs Agency, Department of Culture, Arts and Leisure (DCAL) Rivers Agency and internally with Natural Heritage, Built Heritage and Hydrology teams about the possible impacts of the scheme before issuing a license. All environmental impacts are considered and mitigation measures are included in any license issued. The amount of water permitted for abstraction will depend upon the scale and nature of the project and site-specific fishery, nature conservation protection designations and WFD water resource flow standards. Getting the balance right between supporting hydropower development and protecting and improving the water environment is a key challenge for this and future River Basin Management Plans.

Under the Abstraction and Impoundment (Licensing) Regulations impounding works/structures not associated with an abstraction, which do not control the water level upstream and do not create a height differential between the upstream and downstream water surfaces of more than 1 metre, are permitted as a Permitted Controlled Activity. In all other circumstances authorisation through formal licence may be required for impoundments of water. The DOE will consult with other agencies that have responsibility for fisheries legislation and, where relevant, the Habitats Regulations in Northern Ireland as part of the assessment & decision making process.

Water Resources (Environmental Impact Assessment) Regulations (NI) 2005

The Water Resources (Environmental Impact Assessment) Regulations (NI) 2005 require agricultural water management projects, such as spray irrigation, which involve the impoundment, abstraction and/or diversion of water from surface or underground sources of volumes greater than 200m^3 per day, to submit an environmental statement to the DOE. Following a determination made under this legislation, an abstraction/impoundment licence may be required.


Strangford Lough

The Fisheries Act (Northern Ireland) 1966

Part 4 of the Fisheries Act protects fisheries and their habitats making it an offence to obstruct the passage of fish or fail to protect fish where water is abstracted and requires the construction of a fish pass where a weir is built or an existing weir is reinstated or altered.

Section 54 of the Fisheries Act requires persons who wish to build dams and weirs or repair existing weirs in rivers to construct fish passes for the free passage of fish. All fish pass designs and specifications must be submitted to the DCAL for approval before a pass is constructed. Sections 58 and 59 of the Fisheries Act impose certain closure periods where water is being abstracted from a river or lake to facilitate the passage of fish and require grids and gratings to be placed at water abstractions and return points.

The Fisheries Act also allows the DCAL to issue exemption certificates from these requirements. The exemptions are used to introduce modern fishery protection measures. In 2007 a review of exemption permits issued under Sections 54, 58 and 59 of the Fisheries Act was continued to ensure that the most appropriate fishery protection measures where included in the permit conditions. DCAL refreshed guidelines in this regard during 2007.

Enforcement of the legislation is carried out by DCAL except in the Foyle and Carlingford catchments where the Loughs Agency of the Foyle, Carlingford and Irish Lights Commission is responsible. However, DCAL retains overall policy responsibility for salmon, eels and certain conservation and development responsibilities in the Loughs Agency areas. Most weirs have fish passes under the Fisheries Act. However an issue has been periodic lack of flow through some fish passes which will be addressed through the abstraction licensing regulations.

The WFD places requirements on Member States to introduce measures to promote efficient and sustainable water use and measures to safeguard the quality of drinking water supplies. There are a number of measures that we are currently taking or are in the process of developing to address these requirements.

Water Supply (Water Fittings) Regulations (Northern Ireland) 2009

The Water Supply (Water Fittings) Regulations (NI) 2009 aim to reduce possible contamination of the public drinking water supply by prescribing appropriate backflow prevention devices in order to prevent contaminated water from entering the public supplies. The Regulations prescribe standards for water pipes, fittings and apparatus using water in order to prevent waste and misuse of water supplied by NIW. The Regulations only apply to fittings connected to the public drinking water supply. The proposed Regulations are designed to ensure that water systems in premises do not contaminate the wider mains water supply. Under the proposed Regulations, NIW will proactively inspect both commercial and domestic properties using a risk-based approach to enforcement.

Water Supply (Water Quality) (Amendment) Regulations (Northern Ireland) 2009

These Amendment Regulations update the existing subordinate legislation, the Water Supply (Water Quality) Regulations (Northern Ireland) 2007. The Regulations ensure continued monitoring of surface water, which will cover the repeal of the European Surface Water Abstraction Directive: promote the principles of the European Union Drinking Water Directive by legislating for the monitoring and risk assessment of substances in public water supplies: also introduce additional enforcement powers for the Department of Regional Development (DRD) to direct Northern Ireland Water (NIW); and offer better clarity and efficiency in communications between NIW and the DRD.

Reduction in water supply leakage levels

Drinking water sources have been developed over many years and in many cases aging distribution networks are subject to high levels of leakage. A key priority for Northern Ireland Water is to reduce leakage to the Economic Level of Leakage, this is a calculated level of leakage at which any further reduction in the leakage level would incur costs in excess of the benefits derived from the savings. The current figure to be achieved by March 2010 is 180.9 mega litres per day. Reduction in leakage rates will reduce:

- environmental impacts at sites where over abstraction occurs;
- pumping and treatment costs; and
- energy use and therefore carbon dioxide emissions.

Drinking Water Safety Plans

The WFD sets out requirements to introduce measures to safeguard water quality in order to reduce the level of purification treatment required for the production of drinking water. Both surface water and groundwater drinking water sources are vulnerable to pollution which can pose health risks which can consequently result in higher treatment costs. NIW has initiated a programme to develop Drinking Water Safety Plans by 2010. NIW and NIEA will develop a risk assessment approach to identify where action is required to reduce the risk of pollution which could affect public drinking water sources as part of the development of water safety plans. Over the period of the first plan similar risk assessments for private drinking water sources will be completed, however this process is reliant on new regulations being made and will only be mandatory for those private drinking water sources required to be registered under this new legislation.

Northern Ireland Water Resource Strategy 2002 – 2030

It is estimated that each person in Northern Ireland uses an average 145 litres of water per day. The Northern Ireland Water Resource Strategy 2002 – 2030 forecasts that present demand will increase by 150 million litres per day by 2030. The strategy emphasises the need to rationalise existing uneconomic water sources and concentrate on the sources that can meet our needs cost effectively and reliably. The main aim is rationalisation of drinking water sources. Implementation of the Northern Ireland Water Resource Plan, which is currently under review, will ensure that this rationalisation takes place.

NIW developed a drought plan in July 2008. This will be further developed as need arises.

Education and awareness

NIW also encourage the wise use of water through a number of campaigns. An example of such a campaign is the promotion of the 'Hippo Water Saver'. This is a simple and low cost water saving device to help conserve water in toilet cisterns. Every time a toilet is flushed the Hippo saves approximately 3 litres of water.

Review of legislation

DOE has undertaken a review of existing legislative controls to control physical modifications to surface waters.

The review identified the existing relevant legislation that provides control on such activities across six main areas: Fisheries, Drainage, Marine, Planning, Water Resources and Conservation. These controls include consents, licences, policies and the requirement for assessments. The relevant legislation rests with the Department of the Environment, Department of Agriculture and Rural Development, Department of Culture Arts and Leisure and Department for Regional Development. Each of these Departments, in line with the 2003 Water Framework Directive Regulations[1] shall exercise its relevant functions in a manner which secures compliance with the requirements of the Directive.

An inter-departmental working group has been established to develop appropriate guidance to supplement legislation offering control over physical modifications, which will ensure compliance with WFD requirements. The working group is a sub-group of the WFD Implementation Working Group and is comprised of officials from DOE NIEA, Planning and Environmental Policy Group, Planning Service, DARD and DCAL with input from other departments/ agencies when necessary.

In addition, as there will soon be extensive new marine legislation, through the Marine Strategy Framework Directive and UK and NI Marine Bills, it is also proposed that there is continuing liaison between WFD and Marine Policy teams within DOE to ensure that the requirements of the Water Framework Directive are taken into account in the drafting of relevant marine legislation. Physical alterations to water bodies have not been previously regulated for the purpose of protecting ecological status as required under the Water Framework Directive.

The review therefore also recommended that further research and monitoring is carried out to assess the relationship between hydromorphology and ecology within the water environment. Ongoing results of such research should be taken into account in policy considerations.

[1]The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003 (No. 544).

Flood Risk Management

NIEA has agreed to take part along with other stakeholders in a pilot study to explore the use of catchment wide sustainable flood risk management techniques. This is being lead by Rivers Agency.

PPS 15 sets out the Department's planning policies to minimise flood risk to people, property and the environment. It adopts a precautionary approach to development decisions which takes account of climate change and is supportive of the wellbeing and safety of people. The Rivers Agency document "Strategic Flood Map – Rivers and Sea" explains how predictive mapping techniques have been employed to take into account modeling predictions including sea levels – this work includes scenarios to 2030 and can be viewed at http://www.riversagencyni.gov.uk/racolor.pdf

What improvement will current measures achieve?

The actions we have described will deliver clear environmental benefits with flows being returned to rivers and fish migration extended. This will have biodiversity, amenity and fisheries benefits. The Water Abstraction and Impoundment (Licensing) Regulations will ensure that abstractions are sustainable and both abstractions and impoundments do not impact on the river's ecological status. Implementation of Fisheries Act legislation will continue to ensure that fish passes are provided in reinstated and new weirs. While implementation of the Abstraction and Impoundment Regulations will also ensure that adequate flow is provided at weirs etc. with existing fish passes resulting in improved access to habitats for fish to breed and grow.

This river basin management plan is also part of the process which will enhance the protection of drinking water sources from pollution helping to ensure that Northern Ireland Water can continue to provide high quality drinking water. Northern Ireland Water's investment to reduce leakage and promote efficient water use by consumers will also deliver benefits for the water environment.

NIEA has been progressively improving its assessment of hydrological impacts as the information it holds on licensed activities has improved. Over the period of the first plan NIEA will take the following actions to progressively improve this assessment:

a) Monitor actual abstraction and compensation flows in those abstractions and dams which have the greatest environmental impact. Actual abstraction and compensation flows will then be used to assess compliance with licence conditions.

b) Develop biological tools in association with other agencies which can be used to assess the ecological impacts of changes in hydrology, including water transfers. It is expected to take until 2011 until the new tools are available for use.

c) Further develop Northern Ireland's Monitoring Programme to directly monitor impacts and to incorporate the newly developed biological monitoring tools.

d) Further develop our understanding of the relationship between groundwater and surface waters.

e) The classification process has identified where the balance between water entering (recharging) a groundwater body and water being abstracted, taking into account the water needs of dependent ecosystems, may be inappropriate. More detailed assessment of water resource availability and management priorities will be targeted at such water bodies.

f) NIEA and the Loughs Agency are involved in a SNIFFER steering group which is developing a tool for assessing the extent to which barriers impede migration of a wide range of species. This tool is expected to be available for use from 2010 and will progressively improve our understanding of the impacts of barriers upon fish movements and migration.

The improvements in data held by NIEA over the period up to 2015 will allow the identification of further measures required to deliver environmental improvements.

The following tables summarise the existing/ planned measures and supplementary measures for Abstraction and Flow Regulation.

Key Sectors: **Water supply, industry, agriculture , hydropower and flood control**
Pressure Type: Abstraction and flow regulation

Summary of existing and planned actions

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Improve flows in rivers and levels in lakes	Control of abstraction and impoundment activities	Water Abstraction and Impoundment (Licensing) Regulations (NI) 2006 Water Resources (Environmental Impact Assessment) Regulations (Northern Ireland) 2005	NIEA		In place
	Reduce leakage rates	Leakage reduction targets to be reviewed through the Price Control process	NIW	DRD / Northern Ireland Authority for Utility Regulation (NIAUR)	2013
	Improve efficiency of use	Guidance and publicity on industrial best practice. Information for customers on how to use water efficiently e.g. Use Water Wisely campaigns	NIW		In place
Allow fish migration	Construction of fish passes where weirs are built or reinstated	Fisheries Act (Northern Ireland) 1966 Foyle and Carlingford N Ireland Fisheries Order (2007)	DCAL, Rivers Agency, Loughs Agency		2015
	Fisheries protection measures at all water abstraction sites	Fisheries Act (Northern Ireland) 1966 Foyle and Carlingford N Ireland Fisheries Order (2007)	DCAL, Rivers Agency, Loughs Agency		In place

Continued on next page

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Protect drinking water sources and provide safe drinking water	Monitor raw water quality and undertake risk assessment of raw water entering water treatment works	Water Supply (Water Quality) Regulations (Northern Ireland) 2009	NIW	DRD, NIEA (Drinking Water Inspectorate)	In place
	Reduce contamination of public drinking water	Water Supply (Water Quality) Regulations (Northern Ireland) 2009	NIW, NIEA (Drinking Water Inspectorate)	DRD	In place
	Enforce compliance. Complete catchment and treatment risk assessments for all water supply systems.	Development of Drinking Water Safety Plans	NIW	DRD	2010
Flooding Control	Manage development where flood risk is an issue Raise public awareness of the causes and impact of flooding	Planning Policy Statement 15 (Planning and Flood Risk)	DOE	Rivers Agency	In place
Promote sustainable development of public water supply	Provide for additional demand whilst minimising environmental harm	NI Water Resource Strategy 2002-2030 Water Resource Plan. Drought management plan. Education and awareness campaigns	NIW	NIEA , DRD	2002-2030
	Reduce level of leakage	Level of Leakage Targets based on economic cost	NIW	DRD / Northern Ireland Authority for Utility Regulation (NIAUR)	In place

Key Sectors: **Water supply, industry, agriculture and flood control**
Pressure Type: Abstraction and flow regulation

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Improve flows in rivers and levels in lakes	Monitor actual abstraction and compensation flows	Water Abstraction and Impoundment (Licensing) Regulations (NI) 2006	NIEA	NIW , DRD	Started May 2009 and ongoing
	Develop biological tools to assess the ecological impacts of changes in hydrology	Research and development	NIEA		2012
	Monitor pressures and impacts and incorporate the newly developed biological monitoring tools	Northern Ireland's Monitoring Programme	NIEA		2011
	Develop our understanding of the relationship between groundwater and surface waters	Research and development	NIEA	NIW , DRD	2011
	Targeted assessment of water resource availability to set management priorities	Research and development	NIEA	NIW , DRD	2012
Allow fish migration	Develop tool for assessing the extent to which barriers impede migration of a wide range of species	SNIFFER steering group	NIEA , Loughs Agency	DCAL	2011

Our aim is to protect, conserve and promote the natural environment and built heritage for the benefit of present and future generations.

Northern Ireland Environment Agency
Water Management Unit
17 Antrim Road
Lisburn
BT28 3AL
T. (028) 9262 3004

www i it in the Department of the