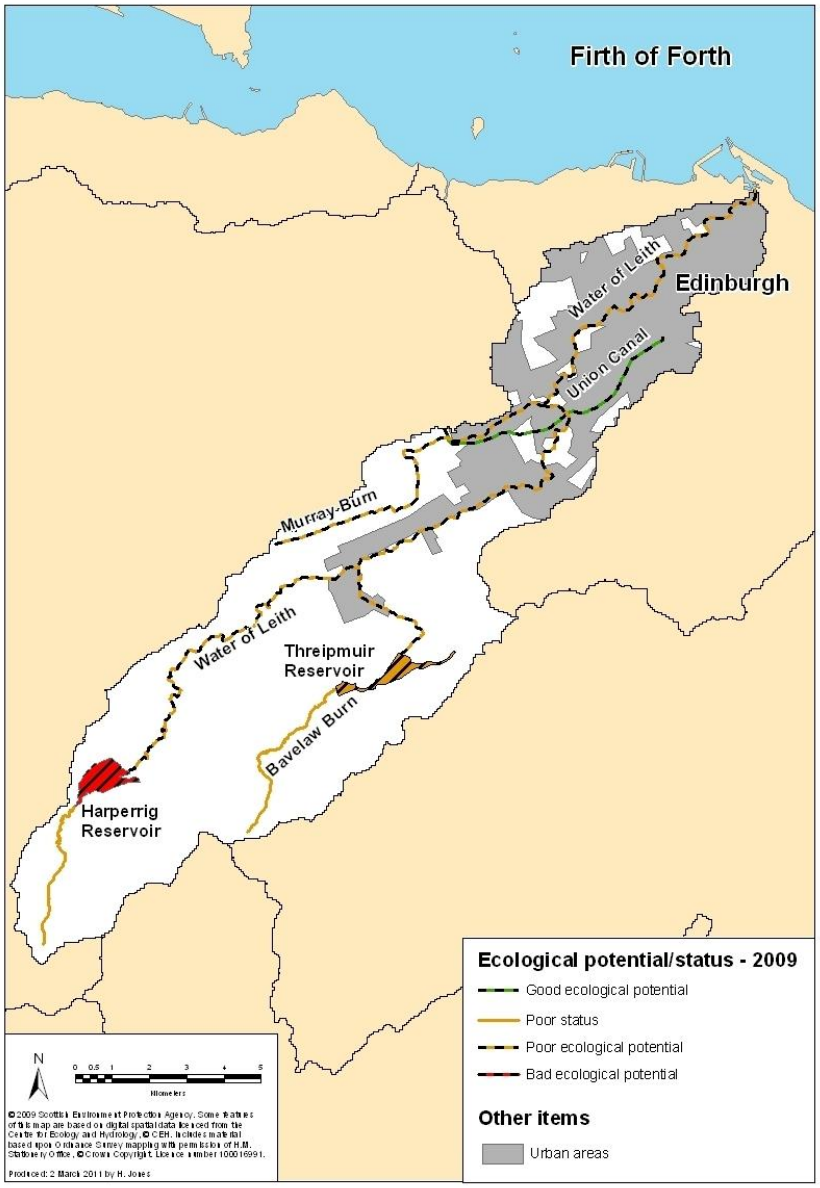
Water of Leith catchment profile

Introduction

The Water of Leith catchment covers a total area of 122 km^2 and predominantly drains the north western slopes of the Pentland Hills from its source in the Colzium springs. The natural channel has been modified during the last 200 years by the construction of impoundments in the headwaters and lower reaches. Dams, weirs, locks and sluices have been built to control the water through many, now redundant, mill sites. However, these structures continue to be significant from a cultural heritage perspective.



Harperrig Reservoir is on the main stem of the river and Threipmuir and Harlaw reservoirs are situated on the Bavelaw Burn, which enters the Water of Leith at Balerno. The Water of Leith runs through the city of Edinburgh and is joined by the Poet, Murray, and Stank Burns – the latter two being culverted along a significant proportion of their lengths - and finally enters the Forth Estuary at the Port of Leith. The portion of the Union Canal within the Water of Leith catchment area is also considered within this catchment profile.

The extent of channel modifications within the Water of Leith catchment has resulted in seven water bodies being designated as heavily modified. Ongoing and future flood prevention works to be undertaken by City of Edinburgh Council will result in further modifications.

The total length of the main stream of the Water of Leith is 31.7 km.

The Water of Leith catchment contains 10 baseline[1] surface water bodies. Two groundwater bodies are associated with the catchment.

Further information on the Water of Leith catchment can be found on the RBMP interactive map.

The Forth Area Management Plan and other catchment profiles within the Forth sub-basin district can be found on SEPA's website.

[1] A baseline water body is a river which drains a catchment greater than 10km^2, lochs bigger than 0.5km^2, all coastal waters out to three nautical miles, transitional waters such as estuaries and groundwaters. A non-baseline water body is a river or loch which falls below the size threshold.

Water-dependent protected areas

The Water of Leith catchment contains the following water-dependent protected areas which are all currently achieving their protected area objectives:

- One drinking water protected area – Edinburgh and Livingston bedrock and localised sand and gravel aquifers
- One freshwater fish designation – Water of Leith
- One urban waste water treatment directive sensitive area – Murray Burn

Classification and pressures summary

The 2009 classification status, pressures and objectives for the Water of Leith catchment and associated groundwater is shown in Tables 1 and 2 below.

Table 1: Classification status, pressures and objectives for baseline water bodies within the Water of Leith catchment in 2009; water bodies are ordered from the upstream extent of the catchment to the downstream extent

Surface water body	Water body ID	2009 classification	Pressures	Good by
Water of Leith (Source to Harperrig Reservoir)	3704	Poor	Morphology – barriers to fish passage	2021
Harperrig Reservoir	100293	Bad ecological potential[2]	Morphology – barriers to fish passage, impounding dam	2027
Bavelaw Burn (Source to Threipmuir Reservoir)	3706	Poor	Morphology – barriers to fish passage	2027
Threipmuir Reservoir	100291	Poor ecological potential	Morphology – barriers to fish passage	2027
Bavelaw Burn (Threipmuir Reservoir to Water of Leith)	3705	Poor ecological potential	Morphology – barriers to fish passage	2027
Water of Leith (Harperrig Reservoir to Poet's Burn confluence)	3703	Poor ecological potential	Morphology – barriers to fish passage	2015
Water of Leith (Poet's Burn confluence to Murray Burn confluence)	3702	Poor ecological potential	Morphology – multiple pressures, barriers to fish passage Diffuse source pollution – sewage	2027
Murray Burn	3701	Poor ecological potential	Morphology – multiple pressures, barriers to fish passage Diffuse source pollution – sewage, mixed farming Point source pollution – sewage disposal	2027

[2] This water body has been downgraded from 'poor' to 'bad' in the 2009 classification as a flow regulation pressure has been added. However, as this regulated flow is a necessary component of the Water of Leith Flood Prevention Scheme it has been determined to be at 'good ecological potential'. Classification will therefore revert back to 'poor' in the 2010 classification.

Water of Leith (Murray Burn confluence to Estuary)	3700	Poor ecological potential	Morphology – multiple pressures, barriers to fish passage Point source pollution – sewage disposal	2027
Union Canal (Murray Burn to Fountainbridge)	9	Good ecological potential	-	-

NB: Pressures that have already been addressed and pressures that have been assessed as having achieved good ecological potential (GEP) are not included within this table.

Table 2: Classification status, pressures and objectives for the groundwater bodies associated with the Water of Leith in 2009

Groundwater	Water body ID	2009 classification	Pressures	Good by
Edinburgh and Livingston bedrock and localised sand and gravel aquifers	150227	Poor chemical status	Diffuse source pollution from mining and quarrying of oil-shale*	Less than good beyond 2027
		Poor hydrological status	Abstraction – livestock farming & manufacturing*	2027
Leith coastal sand and gravel	150192	Good overall	-	-

*These pressures are associated with borehole abstractions and historic mining-related pollution in other surface water catchments which this groundwater underlies.

Small water bodies

The Stank Burn (3707) is a small (non-baseline[3]) water body within the Water of Leith catchment. It is under pressure from diffuse source pollution associated with urban development and is culverted along its entire length.

Pressures, measures and objectives summary

No deterioration objectives

No pressures exist on the groundwater body at good status and on the water-dependent protected areas. Under the Water Framework Directive we have a requirement to ensure that there is no deterioration in status.

For those water bodies currently less than good ecological status/potential the objective is to ensure that no further deterioration occurs, in addition to any improvement objectives.

Verification of good ecological potential

Through work with the operators and expert judgement, 10 out of the 22 pressures causing the heavily modified/artificial water body designations on the heavily modified/artificial water bodies are deemed to be at good ecological potential i.e. all mitigation measures have been carried out without impact to the current use of the modification. However, there is a need for SEPA to verify the assessments by 2014; either by local knowledge or site visits. The objective for these is to ensure that there is no deterioration.

[3] Under the Water Framework Directive we are only required to formally identify pressures, determine the classification status, develop and implement measures and report progress to the European Commission for baseline water bodies. However, the Water Framework Directive applies to the whole water environment and if any pressures exist on non-baseline water bodies we would seek to address these through river basin planning; especially, for example, where an activity on a non-baseline water body causes, or has the potential to cause, a downgrade in status to a downstream baseline water body or protected area.

Water resources

The abstraction pressures associated with the Edinburgh and Livingston bedrock and localised sand and gravel aquifers groundwater body is projected to be fixed by 2027. Although this groundwater body underlies the Water of Leith catchment, the abstractions are actually within the adjacent River Almond catchment. Addressing the pressure will involve discussions with the water-users and a review of the Water Environment (Controlled Activities) Regulations 2005 licences.

Morphology

Barriers to fish passage

Whilst the gates at Leith Docks present an intermittent barrier to fish entering the Water of Leith catchment, the first permanently impassable barrier is located at Millar Row (upstream of Dean Bridge) on the Water of Leith (Murray Burn confluence to Estuary) water body. As this is the lowest downstream water body in the catchment, this barrier prevents fish accessing every upstream water body and is the main reason why the majority of the catchment is at poor status.

Through engagement with fisheries stakeholders in 2011, a further eight impassable barriers have been identified on the main stem of the Water of Leith between Millar Row and Currie. This information will be used to inform the water body classification.

The current water body objective is to address the Millar Row weir, potentially through restoration funding, by 2015. However, in the light of the new information on barriers and the partially impassable nature of the docks, this deadline should be re-visited and mitigation options fully scoped and costed to determine if investment is appropriate. If so, a catchment approach to tackling the barriers would be the preferred approach.

Upstream, the reservoir impoundments at Harperrig, Harlaw and Threipmuir are downgrading these reservoirs and the upstream Water of Leith (Source to Harperrig Reservoir) and Bavelaw Burn (Source to Threipmuir Reservoir) water bodies to less than good status. Significant investment would be required to install fish passage at these sites and action will only be taken if the downstream barriers are addressed and if a detailed scoping study determines that enabling access presents significant environmental benefit.

The Murray Burn needs to be assessed to determine whether the culvert presents a barrier to fish passage and if so mitigation options should be considered.

Urban development

City of Edinburgh Council have taken responsibility for Harperrig reservoir as part of the Water of Leith flood prevention scheme and are therefore the responsible body for delivering the required improvements to the modified habitat by 2027. Consideration will need to be given to the type of improvements necessary and early discussions should take place between SEPA and the council.

Although subject to multiple morphological pressures, the key morphological pressure on the Murray Burn is the approximately 2km long culvert which runs from the Union Canal at Sighthill to Longstone Road. Discussions are required with City of Edinburgh Council to progress the delivery of work to achieve the improvements by 2020.

The council are also the appropriate body for delivering improvements to modified habitat on the Water of Leith (Poet's Burn confluence to Murray Burn confluence) and Water of Leith (Murray Burn confluence to Estuary) water bodies by 2027. Again, early discussions should be initiated with the council to progress measures delivery due to the likely long timescales involved in City of Edinburgh Council addressing them.

Point source pollution

The culvert which discharges to the Murray Burn at Longstone is causing a point source sewage pressure on this water body. On the downstream Water of Leith (Murray Burn confluence to Estuary) water body, unauthorised intermittent discharges from surface water outfalls are recorded as a pressure. Scottish Water investment is proposed to address these issues by 2025.

Diffuse Source Pollution

Agriculture
The Murray Burn is impacted by diffuse pollution associated with farming activities. The catchment is a candidate priority catchment for the third river basin planning cycle. This means that focused work to tackle rural diffuse pollution within the catchment will commence in 2021 with an aim to achieve improvements by 2027. Further information on the priority catchment approach can be found on SEPA's website:
http://www.sepa.org.uk/water/river_basin_planning/dp_priority_catchments.aspx

Sewage/urban development
Investment by Scottish Water to improve existing sustainable urban drainage systems or install new sustainable urban drainage systems should address the diffuse pollution pressure on the Water of Leith (Poet's Burn confluence to Murray Burn confluence) water body by 2025.

The Murray Burn is also under pressure from diffuse inputs from sewage. Scottish Water investment will help alleviate this problem by 2025.

Mining and quarrying of coal
Historic mining activities, primarily associated with the adjacent River Almond catchment, have resulted in deterioration in the quality of the Edinburgh and Livingston bedrock and localised sand and gravel aquifers groundwater body. It is projected that the time taken for the water quality to be restored will be beyond 2027.

Invasive non-native species

No water bodies are currently downgraded to less than good on account of the presence of aquatic invasive non-native species. However, Threipmuir reservoir only attains good rather than high status due to the presence of Canadian pondweed, *Elodea canadensis*.

Riparian invasive non-native species such as Japanese knotweed, giant hogweed, Himalayan balsam and rhododendron are currently not incorporated into the morphology component of the Water Framework Directive classification scheme. However, this is expected to change before the end of the first river basin planning cycle. Efforts should be targeted to map the location of riparian invasive non-native species as this can be used by SEPA to inform future classification outputs. Please contact SEPA for a copy of the survey method. The Water Environment Restoration Fund can be used to fund eradication projects.

Japanese knotweed, giant hogweed and Himalayan balsam are all present within the catchment. The Water of Leith Conservation Trust have undertaken some work to control Japanese knotweed and giant hogweed as have City of Edinburgh Council. Himalayan balsam is a particular issue on the main stem of the river and the Water of Leith Conservation Trust have mapped the riparian Himalayan balsam population and undertaken some control work. However, the problem remains.

The River Forth Fisheries Trust has produced a biosecurity plan for the Forth district which covers a very similar area to the Forth Advisory Group area. Key objectives of the plan include preventing the introduction and spread of invasive non-native species, establishing a framework for detection and surveillance, and developing co-ordinated control and eradication programmes for invasive non-native species. This work will directly assist the achievement of RBMP objectives.

Areas for action

No.	Action	Suggested owner	Date
1	Engage with Scottish Water to promote appropriate projects into future quality and standards investment periods and ensure measures are on track to deliver	SEPA quality and standards team	Ongoing - 2025
2	Raise awareness of diffuse pollution and diffuse pollution general binding rules to support future priority catchment work.	Forth AAG/SEPA Land Unit/RBMP coordinator/local operations team	Ongoing - 2027
3	Continue to raise profile of RBMP and requirement to protect and improve the water environment.	SEPA/All AAG members	Ongoing - 2027
4	Work through AAG INNS sub-group to ensure co-ordinated action to tackle invasive non-native species to meet RBMP objectives.	River Forth Fisheries Trust/AAG INNS sub group	Ongoing - 2027
5	Continue to gather information on location of barriers to fish passage from appropriate stakeholders.	SEPA/Water of Leith bailiffs/conservation trust/RFFT/AAG	2011 - ongoing
6	Investigate and engage with stakeholders to determine options to tackle impassable fish barriers within catchment.	SEPA/Water of Leith bailiffs/conservation trust/RFFT/AAG	2011- ongoing
7	Determine whether the culvert on Murray Burn presents a barrier to fish passage.	SEPA RBMP co-ordinator/Water of Leith bailiffs	2011
8	Verification of pressures at good ecological potential	SEPA local operations team	2012
9	Commence discussions with City of Edinburgh Council on necessary morphological improvements for Harperrig Reservoir, Murray Burn, Water of Leith (Poet's Burn confluence to Murray Burn confluence) and Water of Leith (Murray Burn confluence to Estuary) water bodies.	SEPA RBMP co-ordinator/hydromorphology and City of Edinburgh Council	2012
10	Scope whether possible to install fish passage at Harperrig, Threipmuir and Harlaw reservoirs. **NB: only if downstream barriers are addressed and environmental benefit can be derived.**	SEPA RBMP co-ordinator/City of Edinburgh Council	2015
11	Review Water Environment (Controlled Activities) Regulations 2005 licences to address abstraction pressures associated with the Edinburgh and Livingston bedrock and localised sand and gravel aquifers groundwater body	SEPA local operations team	2021
12	Ensure priority catchment work progresses	SEPA land unit	2021
13	Monitor groundwater quality to ensure improving	SEPA local operations team	Ongoing – beyond 2027