

## River Carron catchment profile

### Introduction

From its source in the Campsie Fells, the River Carron drains an area of approximately 192 km<sup>2</sup> before entering the Firth of Forth via the Carron Estuary at Grangemouth.

The Carron catchment supports a mix of urban and rural land-use. Commercial conifer forests cover the upper reaches around the Carron Valley Reservoir while agriculture is the main land use along the Auchenbowie/Avon Burn. Both the Carron Valley and Loch Coulter reservoirs are significant water resources serving important functions in the supply of drinking water. In the lower reaches the land becomes more heavily urbanised with major road networks, towns and settlements which includes parts of Cumbernauld and Falkirk together with Denny, Bonnybridge and Larbert.

The catchment contains 14 baseline<sup>1</sup> surface water bodies, including five heavily modified water bodies and three artificial water bodies (canals). There are two groundwater bodies.

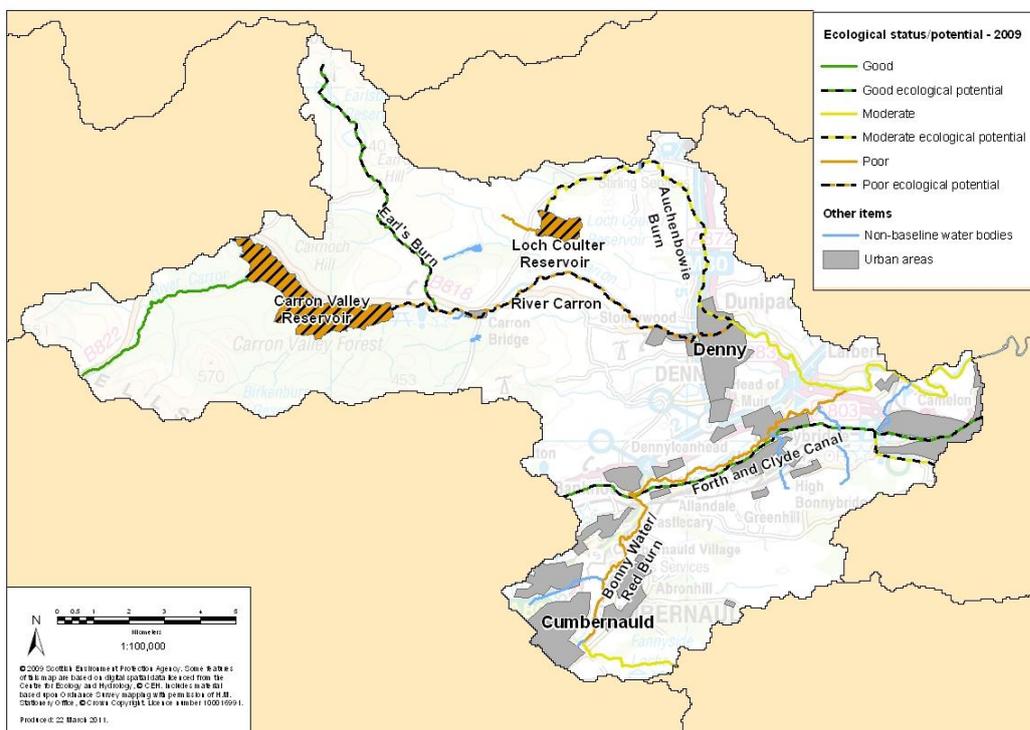


Figure 1 River Carron catchment

### Water-dependent protected areas

The catchment contains the following protected areas which are all currently achieving their objectives:

- Nine drinking water protected areas
- One freshwater fish directive – River Carron (Denny)
- One urban waste water treatment directive sensitive area – River Carron including Bonny Water and Red Burn

Further information on the River Carron 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](#)

<sup>1</sup> A baseline water body is a river which drains a catchment greater than 10km<sup>2</sup>, lochs bigger than 0.5km<sup>2</sup>, 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.

## Classification and pressures summary

The 2009 classification status, pressures and objectives for the River Carron 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 River Carron catchment in 2009; water bodies are ordered from the upstream extent of the catchment to the downstream extent**

Surface water bodies	Water body ID	2009 classification	Pressures	Good by
River Carron (Source to Carron Valley Reservoir)	4203	Good ecological status	-	-
Carron Valley Reservoir	100283	Poor ecological potential <sup>2</sup>	Flow regulation	2015
River Carron (Carron Valley Reservoir to Avon Burn confluence)	4202	Poor ecological potential	Abstraction Flow regulation Morphology – fish barrier	2027
Earl's Burn	4212	Good ecological potential	-	-
Auchenbowie Burn (Source to Loch Coulter Reservoir)	4211	Poor ecological status	Morphology – downstream fish barriers	2027
Loch Coulter Reservoir	100279	Poor ecological potential	Morphology – fish barriers	2027
Auchenbowie Burn (Loch Coulter Reservoir to River Carron)	4210	Moderate ecological potential	Morphology – mixed farming, weirs/offtakes associated with Howietoun fishery	2027
River Carron (Avon Burn to Bonny Water confluences)	4201	Moderate ecological status	Point source pollution – sewage disposal	2021
River Carron (Bonny Water confluence to Carron Estuary)	4200	Moderate ecological status	Point source pollution – sewage disposal Diffuse source pollution – urban Morphology – multiple pressures	2027
Glencryan Burn	4206	Moderate ecological status	Diffuse source pollution – iron	2027
Bonny Water/Red Burn	4205	Poor ecological status	Point source pollution – sewage disposal Diffuse source pollution – urban	2027
Union Canal (Falkirk Wheel to Greenbank)	4	Moderate ecological potential	Point source pollution – manufacturing	2027
Forth and Clyde Canal (Wyndford to Rough Castle)	3	Good ecological potential	-	-
Forth and Clyde Canal (Rough Castle to Grahamston)	2	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.

<sup>2</sup> In the 2010 classification (to be published late 2011) the Carron Valley Reservoir will be at good ecological potential. This is because the flow regulation pressure has been removed as it doesn't impact on the loch itself but on the downstream water environment.

**Table 2: Classification status, pressures and objectives for the groundwater bodies associated with the River Carron in 2009**

Groundwater	Water body ID	2009 classification	Pressures	Good by
Stirling and Falkirk bedrock and localised sand and gravel aquifers	150234	Poor chemical status	Diffuse source pollution from mining and quarrying of coal	Less than good beyond 2027
		Good hydrological status	-	-
East Campsie bedrock and localised sand and gravel aquifers	150395	Good overall	-	-

### Small water bodies

There are a number of small (non-baseline<sup>3</sup>) water bodies associated with the catchment: Carmuir Burn, Camelon; Rowantree Burn, Bonnybridge; Milnquarter Burn, Bonnybridge; Bogstank Burn, Cumbernauld; unnamed tributary of the Red Burn at Carbrain; Buckieburn Reservoir; Faughlin Reservoir; Castlerankine Burn and Slafarquhar Burn. There are also other small water bodies within the catchment.

There are pressures on some of these water bodies; for example, elevated iron levels associated with historic fire clay mining cause problems for the Carmuir, Rowantree and Milnquarter Burns. As the Water Framework Directive applies to the whole water environment we should be harnessing opportunities to improve the condition of any small water body where possible.

### **Pressures, measures and objectives summary**

#### **No deterioration objectives**

No pressures exist on the groundwater body, East Campsie bedrock and localised sand and gravel aquifers, which is at good status. The objective for this water body is to ensure that it does not deteriorate in status.

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

#### **Verification of good ecological potential**

In the case of the two Forth and Clyde Canal water bodies which are at good ecological potential (GEP), there is a need for SEPA to verify the assessment that the pressures on them are at good ecological potential. The objective for these is to ensure that there is no deterioration. SEPA also need to verify that the morphological pressures on the Carron Valley Reservoir are at good ecological potential.

There is need to verify the historic Scottish Water measure relating to the Longhill Weir on the River Carron (Carron Valley Reservoir to Avon Burn Confluence) water body in order to confirm that it has been carried out and that the pressure has achieved good ecological potential.

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<sup>3</sup> 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**

### Abstraction

On the River Carron (Carron Valley Reservoir to Avon Burn confluence) water body, the measure to address the Scottish Water abstraction at Slafarquhar is projected to be delivered by 2014.

### Flow regulation

The regulated flow associated with the Carron Valley Reservoir which is affecting the downstream River Carron (Carron Valley Reservoir to Avon Burn confluence) water body is down to be addressed by Scottish Water by 2014.

The diversion of flow from the Auchenbowie Burn (Loch Coulter Reservoir to River Carron) to the Bannock Burn in the adjacent Stirling coastal catchment has recently been identified by the River Carron Fisheries Management Group as a pressure on the Auchenbowie Burn. SEPA are currently investigating this and a flow regulation pressure will be added to the water body and future classification amended accordingly.

## **Point source pollution**

In the River Carron (Avon Burn to Bonny Water confluences), the final effluent quality at the Denny waste water treatment works is causing a downgrade in water body status. In the Bonny Water/Red Burn water body, the final effluent quality at the Dunnswood waste water treatment works is causing a downgrade in water body status.

In the River Carron (Bonny Water confluence to Carron Estuary) water body, the cumulative impact of the final effluent quality from the Denny and Dunnswood waste water treatment works combined with the final effluent quality at the Bonnybridge waste water treatment works is causing a downgrade in status.

It is proposed that a phased improvement approach between 2013 and 2025 will be delivered through the Scottish Water Quality and Standards Investment Programme with improvements delivered to the final effluent quality at the Dunnswood, Denny and Bonnybridge waste water treatment works. This should enable the water bodies to achieve good status by 2025.

The point source pressure on the Union Canal (Falkirk Wheel to Greenbank) water body is associated with historic mercury pollution from an old munitions factory at Redding Industrial Estate. British Waterways carried out dredging in the past to remove contaminated sediments as part of the millennium link project and over time we would expect to see some natural recovery. SEPA will review future classification outputs to determine if any future measures are required.

## **Diffuse source pollution**

Diffuse pollution associated with surface water outfalls (SWOs) in Cumbernauld is generating a downgrade in status in both the Bonny Water/Red Burn and the River Carron (Bonny Water confluence to Carron Estuary). Although Scottish Water is carrying out some SWO improvement works by 2012, further improvements need to be delivered at a number of other SWOs. It is proposed that this will be incorporated into a future Scottish Water Quality and Standards Investment Programme with an aim to deliver improvements by 2027.

Road drainage from the A80 is causing diffuse pollutants to enter the Bonny Water/Red Burn. Transport Scotland is projected to either retrofit or improve existing SUDS as part of the upgrading of the A80 to address this issue by the end of 2011.

The cause of the iron failure on the Glencryan Burn water body is likely to be associated with the Glencryan Quarry. Further investigations are required to confirm the quarry as the source. Measures are then required to be developed to address this pressure.

## **Morphology**

### Barriers to fish passage

Barriers to fish passage are present throughout the catchment. In the case of fish barriers, a barrier further down the catchment will affect every upstream water body unless there is a natural barrier, e.g. waterfall, upstream of the man-made barrier. If a natural barrier exists downstream of a man-made barrier, the man-made barrier will not be captured as a pressure as the fish would never be able to reach it on account of natural barrier.

The River Carron Fisheries Management Group has provided a list of the natural and man-made barriers within the catchment which will be used to inform the 2010 classification and therefore the classification may change.

Clarification is required as to whether the Auchinlillylinn Spout, a natural obstruction at NS 75790 84535, actually poses a barrier to fish passage. At present it is recorded as preventing access and the classification results are affected by this. This is the situation for the Carron Valley Reservoir dam which ordinarily would prevent access to migratory salmonids. However, the downstream Auchinlillylinn Spout poses a natural barrier and therefore this man-made barrier is deemed to be at good ecological potential. This is also the case for the Earl's Burn water body where, on account of the Auchinlillylinn Spout, the downstream Fankerton weir is not recorded as a pressure.

In the Auchenbowie Burn (Loch Coulter Reservoir to River Carron) water body, the weirs/offtakes/lades associated with Howietoun Fishery at Milnholm are currently recorded as a pressure on this water body and the upstream Loch Coulter Reservoir and Auchenbowie Burn (Source to Loch Coulter Reservoir) water bodies. The River Carron Fisheries Management Group have provided confirmation of a natural barrier slightly upstream of these man-made obstructions and therefore these fish barrier pressures can be removed from these upstream water bodies.

The current measure is to seek fish passage through discussion with the operator by 2027. However, given the close proximity of the natural barrier to the man-made obstructions, the environmental benefit is likely to be minimal and would involve unnecessary expenditure and therefore should be revised.

The barrier to fish passage at the former Carrongrove Paper Mill at Fankerton/Stoneywood on the River Carron (Carron Valley Reservoir to Avon Burn confluence) water body is downgrading this water body. It is planned that fish passage will be installed at this barrier as part of a housing development by 2015.

The man-made weir on the Castlerankine Burn, a tributary of the River Carron (Carron Valley Reservoir to Avon Burn confluence) is downgrading the water body and has a measures delivery deadline of 2027. However, this burn is the most productive spawning tributary for migratory fish within the catchment, with the highest quality salmonid spawning gravels and therefore it might be worth prioritising action at this site. Discussions need to take place with the landowners to investigate the mitigation options, potentially using Water Environment Restoration Funding.

### Urban development

The River Carron (Bonny Water confluence to Carron Estuary) water body contains multiple morphological pressures associated with urbanisation. Discussions with landowners and influencing through the development planning process should hopefully enable the delivery of measures to address these pressures by 2027.

### Agriculture

The Auchenbowie Burn (Loch Coulter Reservoir to River Carron) water body is impacted from high impact channel realignment associated with farming activities. The Carron catchment is a candidate priority catchment for work in the third river basin planning cycle (2021 – 2027). This means that focused work to tackle these morphological pressures will commence in 2021 with an aim to achieve improvements by 2027.

Further information on the priority catchment approach can be found on the [priority catchment page on SEPA's website](#).

## 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.

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.

The River Forth Fisheries Trust has produced a biosecurity plan for the Forth district which covers a very similar area to the Forth Area Advisory Group. 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.

The Falkirk Invasive Species Forum was formed in 2010 to address the problem of riparian invasive non-native species, in particular Japanese knotweed, for the entire River Carron catchment. The mainstem of the river was mapped in 2010 by the Communities along the Carron Association and FCE Consultants have carried out mapping of Japanese knotweed, giant hogweed, Himalayan balsam and rhododendron which includes all watercourses draining into the River Carron.

## 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/Scottish Water	Ongoing - 2027
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 gather information on barriers to fish passage from appropriate stakeholders.	River Carron Fisheries Management Group/RFFT/SEPA	Ongoing - 2027
4	Work through AAG INNS sub-group to ensure co-ordinated action to tackle invasive non-native species to meet RBMP objectives. Ensure links with CATCA and Falkirk Invasive Species Forum.	River Forth Fisheries Trust/AAG INNS sub group	Ongoing - 2027
5	Investigate options and deliver action to address morphological pressures associated with urbanisation on the River Carron (Bonny Water confluence to Carron Estuary) water body.	SEPA/Falkirk Council	Ongoing - 2027
6	Investigate options for treating minewater discharges into Carmuir, Rowantree and Milnquarter Burns	SEPA/Coal Authority/River Carron Fisheries Management Group	Ongoing - 2027
7	Continue to raise profile of RBMP and requirement to protect and improve the water environment.	All AAG members	Ongoing - 2027
8	Investigate and address flow regulation pressure downstream of Milnholm weir on Auchenbowie Burn	SEPA local operations team	On-going

	(Loch Coulter Reservoir to River Carron) water body.		
9	Ensure that links are made between RBMP and the Communities along the Carron Association.	SEPA/AAG	On-going
10	Investigate mitigation options for man-made weir on Castlerankine Burn	River Carron Fisheries Management Group/Forth DSFB/SEPA	2012
11	Investigate cause of iron failure in the Glencryan Burn	SEPA local operations team	2012
12	Develop appropriate measures once cause of iron failure in the Glencryan Burn is identified	SEPA local operations team/environmental quality/RBMP co-ordinator	2021-2027
13	Work with AAG agricultural representatives to engage landowners to discuss how high-impact channel realignment on the Auchenbowie Burn (Loch Coulter Reservoir to River Carron) water body could be addressed.	Forth AAG/SEPA RBMP co-ordinator and hydromorphology specialists	2021 - 2027