Water Use

Supporting Guidance (WAT-SG-78)

Sediment Management Authorisation (replacing WAT-PS-06-03)

Version: v1

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Copyright and Legal Information

Update Summary

Version	Description
v1	First issue for Water Use reference using approved content from the following documents: *WAT-PS-06-03: Sediment Management*

Notes

References: Linked references to other documents have been disabled in this web version of the document. See the References section for details of all referenced documents.

Printing the Document: This document is uncontrolled if printed and is only intended to be viewed online.

If you do need to print the document, the best results are achieved using Booklet printing or else double-sided, Duplex (2-on-1) A4 printing (both four pages per A4 sheet).

Always refer to the online document for accurate and up-to-date information.

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1. Key Points

This document provides additional supporting guidance to that available in *WAT-SG-26: Good Practice Guide - Sediment Management* and sets out the principles on which SEPA authorises sediment management.

It also incorporates the information previously available in *WAT-PS-06-03: SEPA's Position Statement on Sediment Management*, which has now been archived.

Under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) authorisation must be in place for all sediment management works within inland surface waters (rivers, lochs and artificial water bodies) and for activities having a significant adverse impact on surface water dependent wetlands.

Sediment is an important component for the stability and the ecology of surface waters. However, SEPA recognises that there may be overriding factors which may necessitate sediment management operations; for example public safety, flood risk, historic engineering issues, land and infrastructure protection or even wider environmental benefit.

The following guidance is intended to aid such judgments in order to:

- Protect and improve the ecological status of surface waters by preservation of natural sediment budgets, resulting habitat features and wildlife reliant upon those features
- Ensure that any proposals for the removal of sediments are dealt with in a nationally consistent manner
- Encourage the development of sediment management strategies for river catchments based on an understanding of the factors affecting sediment supply and transport
- Ensure that sediment removal is undertaken in a justified, co-ordinated and sustainable manner, with minimal impact on biological diversity and natural river processes
- Promote the importance of river and loch sediments and associated wildlife.

2. Introduction to Sediment Management and its Impacts

Sediment refers to natural loch and river bed substrate, including fine silts, sands, pebbles, cobbles and large boulders.

Sediments are an integral part of the complex system that determines flow character, form and ecology within rivers and lochs. In essence, water flow gives rise to sediment erosion, transportation and deposition, which are major determinants in establishing ecological habitats. Sediment features and resulting vegetation in turn affect hydraulic roughness and channel form which feed back to affect flow conditions and sediment processes.

The effects of human intervention within this system can be unpredictable, leading to further changes in the surface water which may result in instability and the need for additional engineering projects to manage sediment.

Managing sediment may involve:

- Removal (e.g. by dredging a length of channel or digging out single accumulations of sediment).
- Addition (e.g. for habitat enhancement) or
- Relocation (e.g. taking sediment from behind a dam or weir and re-introducing it to the river downstream.)

Commonly sediment is managed for the following reasons:

- Sediment removal for flood defence
- Sediment introduction and removal for fisheries interests
- Vegetation cutting and removal, with associated sediment removal
- Capital works e.g. bed material used for bank protection/re-profiling or removed for culvert and bridge maintenance
- Improved conveyance for navigation
- Aggregate extraction
- Land drainage

2.1 Impacts of Sediment Extraction

The risk to the environment from sediment management may vary depending on:

- Size/composition of sediment i.e. gravel vs. silt or other fine material
- Scale and extent of works i.e. volumes and lengths affected
- Timing and frequency of works
- Submerged vs. exposed areas being manipulated

- Ecological sensitivity of the watercourse e.g. existing physical pressures, conservation status, suitability for fish spawning
- Working methods
- Previous/historic engineering of the watercourse

While sediment management is sometimes necessary, the physical impacts of sediment removal need to be considered.

Examples of impacts from sediment removal

Extraction of bed material in excess of natural replenishment rates can result in channel incision (erosion of the bed) and/or increased bank erosion. Channel incision can have consequent impacts on channel morphology, including channel geometry and channel stability. These impacts can be pronounced in rivers where the supply of sediment is limited, for instance downstream from impoundments that are blocking the supply of sediment.

Gravel removal can create an unnaturally hard bed layer, which is of lower ecological value than a more mobile bed surface layer found in certain types of river.

Where **natural armoured bed layers** are present due to river type, gravel extraction can destabilise armour layers and increase fine sediment inputs resulting in local channel instability and downstream gravel siltation.

Removal of sediment from bar features (gravel bar skimming) can reduce hydraulic roughness and result in loss of habitat diversity.

Gravel extraction can alter pool-riffle spacing, affecting stream energy dissipation and channel stability.

Where **dredging** occurs, riverbanks and loch shorelines can also be re-profiled, increasing their susceptibility to erosion and damaging important riparian habitats.

Changes to the flow regime and channel stability can lead to further erosion/deposition problems which initiates further hard engineering measures.

Sediment removal can also impact directly or indirectly on river ecology:

Raised levels of suspended solids in downstream waters – with the potential to smother invertebrate beds and kill fish through gill damage.

Removal of substrate providing anchorage for aquatic flora and habitat for aquatic fauna.

The **operation of heavy equipment** in the channel can directly destroy habitats and increase fine sediment inputs and water turbidity.

Invertebrate populations can be adversely affected by **dredging and shoal removal**, particularly in rivers that have limited re-supply of gravel from

upstream sections, tributaries or floodplains, and where operations are extensive.

Fish (particularly salmon, lamprey, sea and brown trout, grayling, dace, chub and barbel) may be adversely affected by **gravel removal** due to the loss of suitable feeding and spawning habitat and cover.

Breeding birds (particularly oystercatcher, redshank and common sandpiper and grey plover) which nest on gravel banks at the margins of rivers may be adversely affected by the **removal of gravel bars and shoals**. Large numbers of bars are needed to sustain these species over the long term. Sand martin and kingfisher nest in unstable river banks that can also be affected.

3. CAR and Sediment Management

Under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) authorisation must be in place for all sediment management works within inland surface waters (rivers, lochs and artificial water bodies) and for activities having a significant adverse impact on surface water dependent wetlands.

The level of authorisation i.e. General Binding Rule, Registration or Licence will depend upon environmental risk.

Under CAR it is the duty of those carrying out a controlled activity to "secure efficient and sustainable water use". For the purposes of engineering works, efficient water use equates to using good practice (see *WAT-SG-26*)

Waste materials that arise as a result of sediment removal are controlled through waste management regulation. For guidance, see *Agricultural Waste* on the SEPA website.

3.1 Regulatory Decision Guidance

SEPA assess licence applications on a case by case basis and encourage applications to be part of sustainable, long term catchment solutions to sediment management issues.

SEPA have published their procedure for assessing engineering licence applications in *WAT-RM-02: Regulation of Licence-level Engineering Activities*, which is based on the following principles.

- Sediment removal or addition can affect water body status and SEPA has a duty to protect and improve, to good, water body status as set out in the River Basin Management Plan.
- Where activities are likely to cause a significant impact on the water environment, such as by failing an environmental standard, they must be fully justified in terms of being the most appropriate option to resolve a problem, balancing the needs of the operator with environmental protection.
- SEPA promotes the development of catchment sediment management plans i.e. a plan for sediment management activities within a catchment which is based on an understanding of sediment issues and river processes at a catchment scale i.e. erosion and deposition and seeks to address the underlying causes of sediment related problems and to deliver a long term sustainable approach to river management.
- Large scale or high risk proposals should be informed by studies or monitoring to ensure that the activity is acceptable.
- Where it is demonstrated that sediment management is required, SEPA expects the work to follow good practice and to ensure that all practicable steps are employed to mitigate impacts upon the water

environment. See *WAT-SG-26: Good Practice Guide - Sediment Management* for more information.

- Common justifications for sediment removal are; navigation, flood risk management, water supply, infrastructure protection and maintenance of previously engineered watercourses e.g. maintenance of functional field drainage, or maintaining stability in historically straightened channels.

The section below gives broad guidance on the acceptability of example proposals under different circumstances. Hard and fast rules do not exist and an element of judgement will be necessary in many cases.

3.1.1 Sediment management example activities and possible justification

Bridge or culvert maintenance

May be justified where the function or integrity of a structure is in danger and sediment accumulation is causing or exacerbating the problem. However, where works are reoccurring, there may be a requirement to undertake a site assessment to find a more sustainable long-term solution, such as the redesign of the problem structure, or treatment of upstream supply of sediment.

Removal of sediment from behind impoundments

Likely to be justified where the removal of sediment is required for the efficient operation of the impoundment for sustainable activities such as water supply, hydropower irrigation etc. However, consideration should be given to downstream impacts of limiting sediment supply. It may be a requirement to remove the sediment from behind the dam and reintroduce it down stream.

Land drainage or protection of agricultural land

May be justified where the watercourse has been routinely managed for land drainage in the past and the works effectively retain the modified state of the river without causing instability e.g. an historically canalised or highly re-aligned stretch. The works must comprise only the minimum work necessary to maintain the managed state of the water body. See *WAT-RM-02* for more details. Less likely to be justified in natural or unmodified watercourses where there has been no previous sediment management, but SEPA will assess such proposals on a case by case basis.

Flood management

May be justified in cases where it is demonstrated that sediment accumulation is increasing flood risk and the benefits of removing sediment

can be quantified. (e.g. using hydraulic and/or sediment transport modelling or other agreed method) and there are no other significantly better environmental options. However, it is likely that sediment will continue to accumulate in problem areas; therefore consideration should be given to longer-term alternatives for flood protection. It is more likely to be justified if part of a catchment oriented flood management strategy. May be difficult to justify if the problem could be resolved by addressing an identifiable root cause of increased flood risk.

Habitat works and fisheries improvements

Only likely to be justified if underlying sediment problem is identified (e.g. reach scale accumulation) and if developed as part of a wider catchment oriented remediation strategy, or where wider improvement to the river and its ecology can be demonstrated. Fisheries Trust biologists may be a useful contact in discussing the wider implications of fishery habitat works. Unlikely to be justified where no underlying sediment problem is identified, and where the works are targeted at a single reach or beat, without consideration of a wider catchment based remediation strategy.

Aggregate extraction for commercial use

Consideration should be given to using aggregate that is not sourced directly from the aquatic environment. May be justified where resource is abundant compared to usage; local habitats are insensitive to such removal; assessment of sediment budget has been made and extraction practices are good. The operator should demonstrate that the above conditions have been met and that a sustainable balance can be achieved. Where these conditions aren't met, the activity is unlikely to be justified.

Control of bank erosion

May be justified where erosion is threatening infrastructure, or the existing modified state of a river (see land drainage above), and it has been shown that sediment deposition is the cause of the erosion and there are no other better environmental options available. Unlikely to be justified where sediment is removed from the bed to reinforce the banks. Consideration should be given to options that do not involve disturbing the channel bed.

References

NOTE: Linked references to other documents have been disabled in this web version of the document.

See the Water >Guidance pages of the SEPA website for Guidance and other documentation (*www.sepa.org.uk/water/water_regulation/guidance.aspx*).

All references to external documents are listed on this page along with an indicative URL to help locate the document. The full path is not provided as SEPA can not guarantee its future location.

Key Documents

- *WAT-RM-02: Regulation of Licence-level Engineering Activities*
- *WAT-SG-26: Good Practice Guide - Sediment Management*

(*WAT-PS-06-03: SEPA's Position Statement: Sediment Management* now Archived)

Further information

Further information on the levels of authorisation required for different sediment management activities can be found in:

- *Agricultural Waste*, SEPA website (www.sepa.org.uk/waste/waste_regulation/agricultural_waste.aspx)

Documents available from the *Engineering Guidance* pages (www.sepa.org.uk/water/water_regulation/guidance/engineering.aspx)

- *Managing River Habitats for Fisheries*
- *Ponds, Pools and Lochans: Guidance on good practice in the management and creation of small waterbodies in Scotland*
- *WWF (2000) Farming and Watercourse Management Handbook*

Documents available from the *Water Publications* pages (http://www.sepa.org.uk/water/water_publications.aspx)

- *Controlled Activities Regulations: A Practical Guide*
- *Dredging: A Land Manager's Guide to the Rules*
- *Floods, dredging and river changes*

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