

The significance and mechanics of fine-sediment infiltration and accumulation in gravel spawning beds

Sear, David A., Frostick, Lynn B., Rollinson, Gavin and Lisle, Thomas E. (2008) The significance and mechanics of fine-sediment infiltration and accumulation in gravel spawning beds. In, Sear, David A. and DeVries, Paul (eds.) *Salmonid Spawning Habitat in Rivers: Physical Controls, Biological Responses, and Approaches to Remediation*. (Symposium, 65) Bethesda, USA. American Fisheries Society, pp. 149-174.

Record type: **Book Section**

Abstract

The accumulation of fine sediment within salmonid redds is generally considered to be one of the main factors contributing to a reduction in embryo survival (Chapman 1988; Reiser 1998; Greig et al. 2005a). As a result, research activity has sought to understand the processes by which fine sediment degrades the incubation environment within a redd (Carling 1984; Lisle 1989; Diplas and Parker 1992; Acornley and Sear 1999). From the outset, we differentiate between the process by which fine sediment moves into the salmonid redd termed infiltration and the summation of this process over time that is accumulation. An additional term often used in the context of fine sediment impacts on salmonids is sedimentation. This is taken to refer to the development of a layer of fine sediment over the surface of the spawning gravels. We argue here that it is the accumulation of fine sediment within the redd and/ or the sedimentation of spawning gravels that result in deleterious impacts on incubating and emerging salmonids. The distinction between the two different survival mechanisms— incubation of the embryos within the egg and emergence of the alevins once hatched—is relevant to the type of infiltration process. Generally, one can hypothesize that the finer silt and clay fraction influences the survival of the incubating embryos, whereas the coarser sand-sized fraction affects the emergence of alevins. Thus, one might envisage conditions where there are low levels of very fine sediment within a spawning gravel but poor overall survival as a result of entombment. This chapter deals predominantly with incubation survival. In this chapter, we explain the theoretical basis for the relationship between fine-sediment accumulation in the redd, sedimentation of spawning beds, and the incubation of salmonid embryos. We then consider the processes of fine sediment transport over the riverbed and the nature of the interaction between it and the gravel bed. Empirical and laboratory measurements of fine-sediment accumulation are reviewed to determine the range of natural variability in fine-sediment accumulation within redds and sedimentation of spawning beds between and within river systems. Finally, we review the methods and techniques for quantifying and modeling fine-sediment accumulation.

Full text not available from this repository.

[Request a copy](#)

More information

Published date: **October 2008**

Related URLs:

<http://store.afsbooks.org/54065p.html>

Keywords: **spawning, gravels, salmon, fine sediment, accumulation**

Identifiers

Local EPrints ID: **66703**

URI: <http://eprints.soton.ac.uk/id/eprint/66703>

ISBN: **1934874035**

PURE UUID: **f315b4ea-6e2a-49bc-a83d-df19c2820656**

ORCID for David A. Sear: orcid.org/0000-0003-0191-6179

Catalogue record

Date deposited: **13 Jul 2009**

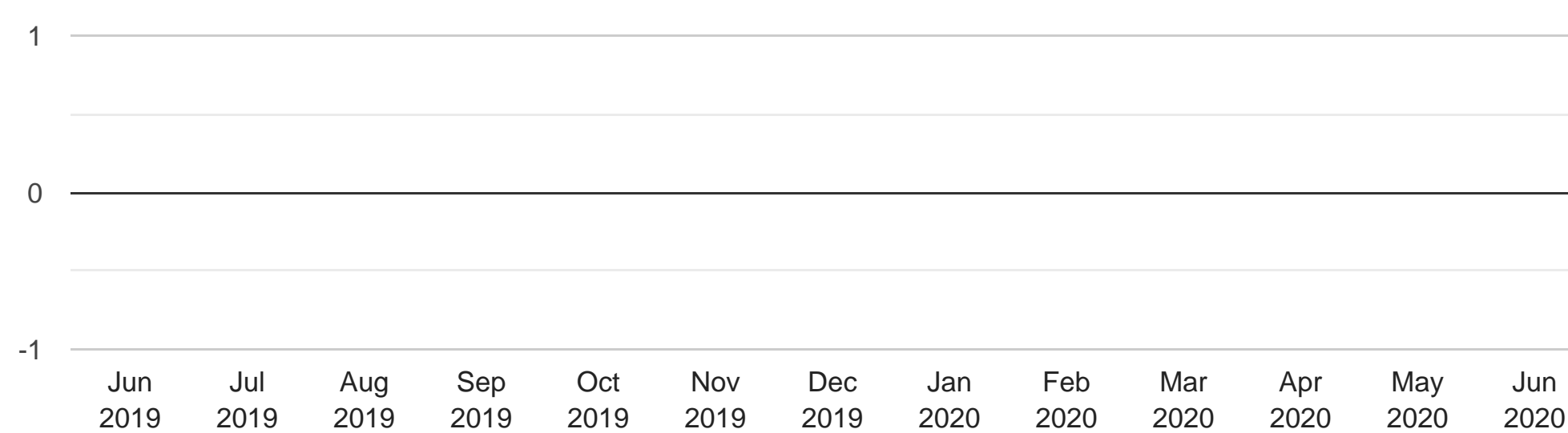
Last modified: **13 Jun 2020 00:25**

Export record

[Export](#)

Download statistics

Downloads from ePrints over the past year. Other digital versions may also be available to download e.g. from the publisher's website.



[View more statistics](#)

[Library staff additional information](#)

Contact ePrints Soton: eprints@soton.ac.uk

[Atom](#) [RSS 1.0](#) [RSS 2.0](#)

ePrints Soton supports [OAI 2.0](#) with a base URL of <http://eprints.soton.ac.uk/cgi/oai2>

This repository has been built using [EPrints software](#), developed at the University of Southampton, but available to everyone to use.