



## Dirt hurts – how much harm can a bit of good, clean dirt do?



### The world's biggest single pollutant

Sediment is by volume the biggest single polluter of the world's waters. Amazing but true.

Sure, rivers, glaciers, landslides, wind and waves steadily wear down the land and carry the residue down to where it will eventually form the next lot of rock – but day to day volumes of sediment getting into waterways from ongoing natural erosion are comparatively small, while big landslides and similar events that do dump large volumes of sediment are rare.

By contrast, rates of sediment runoff from construction sites are typically 10 to 20 times higher than off agricultural land and one to two thousand times higher than from forested land.

It adds up: 'In one storm, a 1-hectare (2½ acre) construction site can lose a centimetre (less than half an inch) of soil to sheet erosion. That thin layer of soil weighs more than 100 tonnes,' says Maurice Mathews from the Sunshine Coast Regional Council in Queensland, Australia.

How many hectares of exposed soils do you have on your construction sites?

It's this sheer volume of sediment from accelerated erosion that makes it a killer. The soil may not be toxic like industrial wastes, or have the massive oxygen demand of foods like milk, which suffocates water creatures by taking all the oxygen out of the water as it breaks down. But accelerated erosion is bad news.

### How bad does it get?

The Chesapeake Bay tells us the story: the largest estuary in North America, its bounty of blue crabs, oysters and fish was legendary, along with its wildlife, from bald eagles and migratory water birds to river otters. Fishing, tourism and recreation were major employers. But rapid development in the catchment affected the Bay's health and its productivity declined over a period of 100 years to the point where the fin and shell fisheries progressively collapsed in the middle of last century – and with them, the seafood and tourist industries. The oyster harvest dropped to than 1% of harvests a century before.

In 1983, a major interstate restoration effort began, but it was not until accelerated sedimentation from development of the catchment was identified as the Bay's major problem that real progress started to be made. Settling out in the sheltered and shallow estuary, the sediment necessitated expensive maintenance dredging for the Port of Baltimore, reduced water clarity and smothered shellfish.

The humble oyster and other shellfish are the key to healthy fin fisheries and bathing waters: like wetlands, they are great natural filters. A healthy oyster can filter up to 20 litres an hour, averaging over 200 litres a day. 100 years ago, the oyster population could totally recycle the entire volume of water in Chesapeake Bay – over 60 cubic kilometres – in three days. Now it takes the reduced population over a year.

Worse still, loss of the oysters had other effects: *Pfiesteria piscicida* (fish-killer) is a micro-organism that inflicts open wounds on fish and swimmers and causes severe brain damage. It now has regular massive blooms that can kill millions of fish, because the catastrophically reduced oyster population can no longer filter it out of the water.



Clare Feeney is a sustainability strategist who helps organisations of all types grow their sustainability capability. She can help you grow jobs, increase profits and improve the environment – and have fun along the way! You can find out more at [www.clarefeeney.com](http://www.clarefeeney.com) and contact her at [clare@clarefeeney.com](mailto:clare@clarefeeney.com).

The good news is that good erosion and sediment and other pollution controls are helping the Bay recover – though there is so much more to do. To find out more go to <http://www.chesapeakebay.net/> and [www.cbf.org/](http://www.cbf.org/).

## The domino effect

What does sediment do to streams, lakes, estuaries and other water bodies?

**Starvation:** sediment-laden water is cloudy and stops light getting through. Plants can't photosynthesise and insects and fish can't see to get their food, or digest what they eat. Because their gills are hurt by the sediment, they can't breathe properly and are more easily caught by predators. If they can't move to cleaner water, they will eventually die out.

**Smothering:** settled sediment smothers plants, insects, shellfish and animals, and fills in the crevices and pools that are their homes: without this shelter they can't breed or hide from predators. Smothering the plants kills off the base of the food web, leaving no food for plant-eating animals – and no food for the bigger fish that eat them. Trout eggs suffocate.

**Sandpaper:** storm flows loaded with sediment are like sandpaper that rasps off the animals and tiny plants living on the bottom of the stream bed and sweeps them away. If the bottom is then smothered, they won't be able to recolonize, leaving the bottom stripped of life.

What does sediment do to people and stock?

**Flooding:** sediment in streams reduces channel capacity and increases flood risk. Sediment also damages property and public utilities by settling out on land or in pipes.

**Farming:** irrigation, stock and domestic water supplies are at risk, with pumps and other equipment damaged. Stock won't drink very dirty water, affecting production (especially of milk) and farm or ornamental dams may fill up.

**Fishing:** even very low concentrations of sediment mean trout and other fish won't take bait, and we've seen what happens in estuaries and sheltered harbours like the Chesapeake.

**Fun:** walking is one of the most popular relaxations, but sediment is a very visible pollutant and will attract a lot of public complaints – don't be the culprit!

In the worst cases where a whole catchment is undergoing prolonged development, the whole system may change, for example excessive stream bed smothering can encourage the growth of undesirable water weeds that trap the sediment, then release it on an ongoing basis, resulting in permanently turbid water that different species will then colonize – midges and bloodworms instead of mayflies and trout, or mangroves on previously sandy beaches.

## Join the dots

People like water. We walk along it, drink it, use it, swim in it, catch fish and shellfish from it.

Healthy waters support our lifestyle and economy.

If we want to enjoy doing all this at the weekend and on holiday, we need to take care of our soils every work day.

It's part of our job to keep soil on the land where it belongs.



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